U.S. SPECIAL OPERATIONS COMMAND'S PROTOCOLS FOR SPECIAL OPERATIONS ADVANCED TACTICAL PARAMEDICS (SO-ATPs)

TACTICAL TRAUMA PROTOCOLS (TTPs)

TACTICAL MEDICAL EMERGENCY PROTOCOLS (TMEPs)

RECOMMENDED DRUG LIST (RDL)

CANINE TACTICAL COMBAT CASUALTY CARE

BURN QUICK REFERENCE GUIDE

NERVE CHARTS

APRIL 2019
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USSOCOM Tactical Combat Casualty Care
Tactical Trauma Protocols (TTPs)

April 2019

Preface:

The USSOCOM Tactical Trauma Protocols (TTPs) in many ways mirror the DoD Defense Health Board (DHB) Committee on Tactical Combat Casualty Care (CoTCCC) guidelines. However, the TTPs are also very unique in several ways. They recognize the advanced skills and knowledge of the SOF medic and consequently include recommendations for advanced interventions such as fresh whole blood collection and administration in the field, head injury management, fasciotomy, escharotomy, and sedation. They further take into consideration the unique and austere nature of the SOF environment by including recommendations for extended tactical field care. The additional items are in green font.

Changes in 2012:

- Added the Junctional Emergency Tool as an option to apply mechanical pressure for inguinal and proximal lower extremity bleeds not amenable to other means of hemorrhage control.
- Added intranasal, intramuscular, and intravenous ketamine as options for pain management of combat casualties.
- Changed the alternate chest decompression site at the 4th/5th intercostal space from the mid-axillary to the anterior axillary line.
- Modified the USSOCOM severe TBI management guidelines to establish consistency with the new TBI guidelines.
- Authorized use of an incompletely blood collection bag as long as the total infusion time remains the same as that of a completely filled blood collection bag.

Changes in 2014:

- Added e-mail address for suggested changes.
- Added Abdominal Aortic & Junctional Tourniquet - AAJT™ and SAM® Junctional Tourniquet
- Added additional characteristic recommendation for supraglottic airways.
- Revised the Administration of Blood and Blood Components protocol to allow for routine transfusion of low titer Type O whole blood as a functional "universal donor" and untitered Type O Fresh Whole Blood *in extremis*.
- Removed recommendation for premedication with Epinephrine and/or Diphenhydramine from the Administration of Blood and Blood Components protocol.
- Minor changes to Crush Syndrome protocol and added example crush injury kit.
- Updated all canine treatment guidelines
- Added Open Globe Injury protocol.

Changes in 2016-2019:

- Updated USSOCOM Tactical Trauma protocols to reflect most CoTCCC TCCC Guidelines for Medical Personnel dated 1 August 2019
- Changed recommendation to replace air with saline in endotracheal tube cuffs to DO NOT replace air with saline in endotracheal tube cuffs.
- Added "Only use air in the endotracheal tube cuffs. Use a cuff manometer to monitor cuff pressures during air evacuation and adjust volumes as needed".
- Added Prolonged Field Care (PFC) Considerations
- Added warning that Once you begin transfusion type O blood, if the patients' blood type is not type O you may not switch to any other type to the Administration of Blood and Blood Products protocol.
- Added field emergency donor panel questionnaire and triage tool to the Administration of Blood and Blood Products protocol.
- Added warnings for the administration of calcium gluconate

- Corrected calcium gluconate dosage for Administration of Blood and Blood Products protocol
- Added Golden Minute Container to Administration of Blood and Blood Products protocol packing list
- Corrected calcium gluconate dosage for Crush Injury protocol
- Added warnings for the administration of mannitol
- Changed number of vials of calcium gluconate in Crush Injury Kit
- Removed mannitol IV filters to the Crush Injury Kit for the safe administration of mannitol
- Updated Concussion Management in Deployed Settings charts to most current version and added new MACE2 exam chart
- Corrected contraindications for ketamine
- Removed Pneumatic Antishock Garment (PSAG)
- Standardized the wording for the administration of fosphenytoin (Cerebyx®) throughout.
- Revised prohibition against donating blood again for 56 days to no wait time if the blood is reinfused into the donor
- Removed recommendation to administer 500mL of Hextend® to blood donors and replaced with; If donor is expected to perform physical labor such as in a tactical situation. Have donor drink 500mL of Oral Rehydration Salts (ORS) mixed in a ratio of 1 packet in 1000mL of potable water.
- Added provisions and guidance to infuse an incompletely filled blood collection bag
- Removed mannitol from the CRUSH SYNDROME PROTOCOL due to lack of practicality
- Modified analgesia guidelines to provide more options and to match the Pain Management TMEPs

USSOCOM
Tactical Combat Casualty Care
Trauma Treatment Protocols (Cont.)

The acronym **MARCH/PAWS** is recommended to guide the priorities in the Care Under Fire (control of life-threatening hemorrhage only) and Tactical Field Care phases:

Massive hemorrhage - control life-threatening bleeding.
Airway - establish and maintain a patent airway.
Respiration - decompress suspected tension pneumothorax, seal open chest wounds, and support ventilation/oxygenation as required.
Circulation - establish IV/IO access and administer fluids as required to treat shock.
Head injury / **H**ypothermia - prevent/treat hypotension and hypoxia to prevent worsening of traumatic brain injury and prevent/treat hypothermia.
Pain - administer appropriate analgesia or sedation to manage pain.
Antibiotics - administer battlefield antibiotics for early prevention of infection.
Wounds - assess and dress additional wounds and check prior interventions.
Splinting - Splint all fractures or provide support to limb dressings.

Basic Management Plan for Care Under Fire

1. Return fire and take cover.

2. Direct or expect casualty to remain engaged as a combatant if appropriate.

3. Direct casualty to move to cover and apply self-aid if able.

4. Try to keep the casualty from sustaining additional wounds.

5. Casualties should be extricated from burning vehicles or buildings and moved to places of relative safety. Do what is necessary to stop the burning process.

6. Stop life-threatening external hemorrhage if tactically feasible

   a. Direct casualty to control hemorrhage by self-aid if able.

   b. Use a CoTCCC-recommended limb tourniquet for hemorrhage that is anatomically amenable to tourniquet use.

   c. Apply the limb tourniquet over the uniform clearly proximal to the bleeding site(s). If the site of the life-threatening bleeding is not readily apparent, place the tourniquet “high and tight” (as proximal as possible) on the injured limb and move the casualty to cover. Ensure that the slack is removed prior to cranking the windlass.

7. Airway management is generally best deferred until the Tactical Field Care phase.

Basic Management Plan for Tactical Field Care

1. Establish a security perimeter in accordance with unit tactical standard operating procedures and/or battle drills. Maintain tactical situational awareness.

2. Triage casualties as required. Casualties with an altered mental status should have weapons and communications equipment taken away immediately. If injuries requiring urgent transport are identified, request casualty evacuation assets as soon as the tactical situation permits. Minimizing the time to surgical care is critical to survival for serious combat injuries.

3. Massive Hemorrhage

a. Assess for unrecognized hemorrhage and control all sources of bleeding. If not already done, use a CoTCCC-recommended limb tourniquet to control life-threatening external hemorrhage that is anatomically amenable to tourniquet use or for any traumatic amputation. Apply directly to the skin 2-3 inches above the bleeding site. If bleeding is not controlled with the first tourniquet, apply a second tourniquet side-by-side with the first.

b. For compressible (external) hemorrhage not amenable to limb tourniquet use or as an adjunct to tourniquet removal, use Combat Gauze™ as the CoTCCC hemostatic dressing of choice.
- Alternative hemostatic adjuncts:
  - Celox Gauze® or
  - ChitoGauze® or
  - XStat™ (Best for deep, narrow-tract junctional wounds)
  - iTClamp (may be used alone or in conjunction with hemostatic dressing or XStat)
- Hemostatic dressings should be applied with at least 3 minutes of direct pressure (optional for XStat™). Each dressing works differently, so if one fails to control bleeding, it may be removed and a fresh dressing of the same type or a different type applied. Note: XStat™ is not to be removed in the field, but additional XStat™, other hemostatic, or trauma dressings may be applied. (Note: XStat is not to be removed in the field, but additional XStat™, other hemostatic adjuncts, or trauma dressings may be applied over it.)
- If the bleeding site is amenable to use of a junctional tourniquet, immediately apply a CoTCCC recommended junctional tourniquet. Do not delay in the application of the junctional tourniquet once it is ready for use. Apply hemostatic dressings with direct pressure if a junctional tourniquet is not available or while the junctional tourniquet is being readied for use.

c. For external hemorrhage of the head and neck where the wound edges can be easily re-approximated, the iTClamp may be used as a primary option for hemorrhage control. Wounds should be packed with a hemostatic dressing or XStat, if appropriate, prior to iTClamp application.
- The iTClamp does not require additional direct pressure, either when used alone or in combination with other hemostatic adjuncts.
- If the iTClamp is applied to the neck, perform frequent airway monitoring and evaluate for an expanding hematoma that may compromise the airway. Consider placing a definitive airway if there is evidence of an expanding hematoma.
- DO NOT APPLY on or near the eye or eyelid (within 1cm of the orbit).

4. Airway Management

a. Conscious casualty with no airway problem identified:
- No airway intervention required

b. Unconscious casualty without airway obstruction:
- Place casualty in the recovery position
- Chin lift or jaw thrust maneuver OR
- Nasopharyngeal airway OR
- Extraglotic airway

c. Casualty with airway obstruction or impending airway obstruction:
- Allow a conscious casualty to assume any position that best protects the airway, to include sitting up.
- Use a chin lift or jaw thrust maneuver
- Use suction if available and appropriate
- Nasopharyngeal airway OR
- Extraglottic airway (if the casualty is unconscious)
- Place an unconscious casualty in the recovery position. Protect spine in blunt and blast trauma patients.

d. If the previous measures are unsuccessful, perform a surgical cricothyroidotomy using one of the following:

- Standard open surgical technique using a flanged and cuffed airway cannula of less than 10mm outer diameter, 6-7 mm internal diameter, and 5-8 cm of intra-tracheal length ~~(Least desirable option)~~
- Bougie-aided open surgical technique using a flanged and cuffed airway cannula of less than 10 mm outer diameter, 6-7 mm internal diameter, and 5-8 cm of intratracheal length
- Cric-Key technique ~~(Preferred option)~~
- Use lidocaine if the casualty is conscious.
- Verify correct airway placement and patency:
  - Self-inflating bulb syringe (e.g., Esophageal Intubation Detector)
  - End tidal CO_2 detector (capnography)
    * In austere or tactical settings where end tidal CO_2 detection and monitoring is not available or accessible, visualization of the tube passing through the glottis opening and auscultation of epigastric and lung sounds may be used.
    * Do not rely on auscultation or visual misting in the ET tube to confirm placement.
    * An endotracheal tube inducer (ETTI - bougie) may be advanced through the tube to assess for “hang up” in the bronchial tree or tracheal ring clicks. Advancement of the ETTI without opposition suggests esophageal placement.
    * Do not rely on the casualty to breathe independently through the airway device. Support ventilation using a bag valve mask (BVM) device. Automatic ventilation devices are an acceptable alternative if available.

e. Cervical spine stabilization is not necessary for casualties who have sustained only penetrating trauma.

f. Monitor the hemoglobin oxygen saturation in casualties to help assess airway patency.

g. Always remember that the casualty’s airway status may change over time and requires frequent reassessment.

* ~~The i-gel is the preferred extraglottic airway because~~ its gel-filled cuff makes it simpler to use and avoids the need for cuff inflation and monitoring. If an extraglottic airway with an air-filled cuff is used, the cuff pressure must be monitored to avoid overpressurization, especially during TACEVAC on an aircraft with the accompanying pressure changes.
* Extraglottic airways will not be tolerated by a casualty who is not deeply unconscious. If an unconscious casualty without direct airway trauma needs an airway intervention, but does not tolerate an extraglottic airway, consider the use of a nasopharyngeal airway.
* For casualties with trauma to the face and mouth, or facial burns with suspected inhalation injury, nasopharyngeal airways and extraglottic airways may not suffice and a surgical cricothyroidotomy may be required.
* Surgical cricothyroidotomies should not be performed on unconscious casualties who have no direct airway trauma unless use of a nasopharyngeal airway and/or an extraglottic airway have been unsuccessful in opening the airway.
*Extraglotttic airways that allow concurrent insertion of a nasogastric tube are preferred because they allow relief of gastric insufflation which is a common side affect from ventilation through an extraglottic airway.

5. Respiration / Breathing

a. In a casualty with progressive respiratory distress and known or suspected torso trauma, consider a tension pneumothorax and decompress the chest on the side of the injury with a 14-gauge, 3.25 inch needle/catheter unit inserted in the second intercostal space at the midclavicular line. Ensure that the needle entry into the chest is not medial to the nipple line and is not directed towards the heart. An acceptable alternate site is the 4^{th} or 5^{th} intercostal space at the anterior axillary line (AAL). Consider rolling the decompression site up to allow air to collect. If the available needle is shorter than 3.25 inches, anterior-axillary line decompression is more likely to be successful than mid-clavicular line decompression. Anterior-axillary catheters may be more prone to kinking due to adduction of the arm in litter casualties. Monitor closely for reaccumulation of tension pneumothorax.

b. All open and/or sucking chest wounds should be treated by immediately applying a vented chest seal to cover the defect. If a vented chest seal is not available, use a non-vented chest seal. Monitor the casualty for the potential development of a subsequent tension pneumothorax. If the casualty develops increasing hypoxia, respiratory distress, or hypotension and a tension pneumothorax is suspected, treat by burping or removing the dressing or by needle decompression.

c. Proceed to digital thoracostomy if casualty deteriorates or does not improve despite needle decompression x 2. Perform bilateral digital thoracostomies in the setting of sudden traumatic arrest during tactical field care or evacuation care phases before discontinuation of resuscitative efforts. Seal digital thoracostomy holes with vented occlusive dressings afterwards and monitor for reaccumulation of tension pneumothorax. Convert digital thoracostomy to tube thoracostomy if evacuation will be significantly delayed or evacuation will be prolonged.

d. Initiate pulse oximetry monitoring. All individuals with moderate/severe TBI should be monitored with pulse oximetry. Readings may be misleading in the settings of shock or marked hypothermia.

e. Casualties with moderate/severe TBI should be given supplemental oxygen when available to maintain an oxygen saturation > 90%.

f. Repeat decompression as required for worsening or recurring signs/symptoms.

g. Consider decompression of the opposite side of the chest if signs/symptoms do not improve.

h. Consider small gauge thoracostomy device or chest tube if needle decompression is unsuccessful after two attempts at each site.

6. Circulation

a. Bleeding

- A pelvic binder should be applied for suspected pelvic fracture:
  -Severe blunt force or blast injury with one or more of the following indications:
  - Pelvic pain
  - Any major lower limb amputation or near amputation
  - Physical exam findings suggestive of a pelvic fracture
  - Unconsciousness
  - Shock
- Reassess prior tourniquet application. Expose the wound and determine if a tourniquet is needed. If there is a vascular injury and the tourniquet is needed, replace any limb tourniquet placed over the uniform with one applied directly to the skin 2-3 inches above the bleeding site. Ensure that bleeding is stopped. If there is not a traumatic amputation, a distal pulse should be checked. If bleeding persists or a distal pulse is still present, consider additional tightening of the tourniquet or the use of a second tourniquet side-by-side with the first to eliminate both bleeding and the distal pulse. If the reassessment determines that the prior tourniquet was not needed, then remove the tourniquet and note time of removal on the TCCC Casualty Card.
- Limb tourniquets and junctional tourniquets should be converted to hemostatic or pressure dressings as soon as possible if three criteria are met: the casualty is not in shock; it is possible to monitor the wound closely for bleeding; and the tourniquet is not being used to control bleeding from an amputated extremity. Every effort should be made to convert tourniquets in less than 2 hours if bleeding can be controlled with other means. Do not remove a tourniquet that has been in place more than 6 hours unless close monitoring and lab capability are available.
- Expose and clearly mark all tourniquets with the time of tourniquet application. Note tourniquets applied and time of application; time of re-application; time of conversion; and time of removal on the TCCC Casualty Card. Use a permanent marker to mark on the tourniquet and the casualty card.

b. IV Access

- Intravenous (IV) or intraosseous (IO) access is indicated if the casualty is in hemorrhagic shock or at significant risk of shock (and may therefore need fluid resuscitation), or if the casualty needs medications, but cannot take them by mouth.
  - An 18-gauge IV or saline lock is preferred.
  - If vascular access is needed but not quickly obtainable via the IV route, use the IO route.

c. Tranexamic Acid (TXA)

- If a casualty is anticipated to need significant blood transfusion (for example: presents with hemorrhagic shock, one or more major amputations, penetrating torso trauma, or evidence of severe bleeding):
  - Administer 1 gm of tranexamic acid in 100mL Normal Saline or Lactated Ringer's as soon as possible but NOT later than 3 hours after injury. When given, TXA should be administered over 10 minutes by IV infusion.
  - Begin the second infusion of 1 gm TXA after initial fluid resuscitation has been completed.

Do not administer tranexamic acid (TXA) (Cyklokapron®) IV push since this may result in hypotension.

Do not administer tranexamic acid (TXA) (Cyklokapron®) through the same IV line as blood products (including recombinant Factor VIIa (NovoSeven®) or fibrinogen) or Hextend®.

  - After administration of the first dose, mark on chest wall "1gm TXA given". After administration of the second dose, change chest wall marking to "2 x 1gm TXA given".

d. Fluid resuscitation

- Assess for hemorrhagic shock (altered mental status in the absence of brain injury and/or weak or absent radial pulse).
- The resuscitation fluids of choice for casualties in hemorrhagic shock, listed from most to least preferred, are: whole blood*; plasma, red blood cells (RBCs) and platelets in a 1:1:1 ratio*; plasma and RBCs in a 1:1 ratio; plasma or RBCs alone; Hextend; and crystalloid (Lactated Ringer's or Plasma-Lyte A pH 7.4). (NOTE: Hypothermia prevention measures [Section 7] should be initiated while fluid resuscitation is being accomplished.)
  - If not in shock:
    - No IV fluids are immediately necessary.
    - Fluids by mouth are permissible if the casualty is conscious and can swallow.
  - If in shock and blood products are available under an approved command or theater blood product administration protocol:
    - Resuscitate with whole blood*, or, if not available
    - Plasma, RBCs and platelets in a 1:1:1 ratio*, or, if not available
    - Plasma and RBCs in a 1:1 ratio, or, if not available
    - Reconstituted dried plasma, liquid plasma or thawed plasma alone or RBCs alone
    - Reassess the casualty after each unit. Continue resuscitation until a palpable radial pulse, improved mental status or systolic BP of 80-90 is present.
  - If in shock and blood products are not available under an approved command or theater blood product administration protocol due to tactical or logistical constraints:
    - Resuscitate with Hextend, or if not available
    - Lactated Ringer's or Plasma-Lyte A pH 7.4
    - Reassess the casualty after each 500mL IV bolus.
    - Continue resuscitation until a palpable radial pulse, improved mental status, or systolic BP of 80-90 mmHg is present.
    - Discontinue fluid administration when one or more of the above end points has been achieved.

      * Continued resuscitation efforts must be weighed against logistical and tactical considerations and the risk of incurring further casualties. The goal of continued resuscitation is the restoration of normal vital signs in the setting of controlled hemorrhage.
- If a casualty with an altered mental status due to suspected TBI has a weak or absent radial pulse, resuscitate as necessary to restore and maintain a normal radial pulse. If BP monitoring is available, maintain a target systolic BP of at least 90 mmHg.

- Reassess the casualty frequently to check for recurrence of shock. If shock recurs, re-check all external hemorrhage control measures to ensure that they are still effective and repeat the fluid resuscitation as outlined above.

* Currently, neither whole blood nor apheresis platelets collected in theater are FDA-compliant because of the way they are collected. Consequently, whole blood and 1:1:1 resuscitation using apheresis platelets should be used only if all of the FDA-compliant blood products needed to support 1:1:1 resuscitation are not available, or if 1:1:1 resuscitation is not producing the desired clinical effect.

7. Hypothermia Prevention

a. Minimize casualty's exposure to the elements. Keep protective gear on or with the casualty if feasible.

b. Replace wet clothing with dry if possible. Get the casualty onto an insulated surface as soon as possible.

c. Apply the Ready-Heat Blanket from the Hypothermia Prevention and Management Kit (HPMK) to the casualty's torso (not directly on the skin) and cover the casualty with the Heat-Reflective Shell (HRS).

d. If an HRS is not available, the previously recommended combination of the Blizzard Survival Blanket and the Ready Heat blanket may also be used.

e. If the items mentioned above are not available, use dry blankets, poncho liners, sleeping bags, or anything that will retain heat and keep the casualty dry.

f. Warm fluids are preferred if IV fluids are required.

8. Head injury management:

a. Key aspects of field management of severe TBI are the prevention of hypoxia and hypotension. Ensure early establishment of a definitive airway, aggressively treat respiratory compromise, administer oxygen if available (to maintain oxygen saturation > 90% with the goal of 95%), and fluid resuscitate hypotension.

b. Routine hyperventilation is NOT recommended. Maintain pCO_2 between 35-40mmHg in the absence of evidence of herniation.

c. Controlled hyperventilation may be considered as a temporizing measure for evidence of increasing intracranial pressure (ICP) and herniation (e.g., deteriorating mental status, unequal pupils, posturing, and irregular respiratory pattern.

d. If end tidal CO_2 monitor is available, ventilate to achieve pCO_2 of 30-35 mmHg. If end tidal CO_2 monitor is not available, ventilate at a rate of 20 per minute and a tidal volume of approximately 500mL. Use the highest oxygen concentration (FiO_2) possible for hyperventilation.

e. Consider administration of Hypertonic saline (3-5%) for evidence of increased ICP:

f. Isolated TBI (hemodynamically stable) - administer 3-5% HS 250mL IV/IO

g. TBI with controlled external hemorrhage - administer 3-5% HS 250mL IV/IO plus Hextend®/other fluids as per 9c. (shock) if required.

h. Seizure prophylaxis for penetrating head trauma/depressed skull fractures: Fosphenytoin (Cerebyx®) 18mg/kg IV/IO at 100-150mg/min if available. Repeat 100mg IV/IO Q8H for maintenance.

Do not administer faster than 150mg/min since this may result in hypotension

i. Seizure management: Diazepam (Valium®) 5-10mg IV/IO q 5 min to maximum dose of 20mg OR Midazolam 5mg IV/IO q 5 min (no maximum dose). Monitor casualty closely for apnea when administering benzodiazepines. Fosphenytoin (Cerebyx®) 18mg/kg IV/IO at 100-150mg/min if available for seizures refractory to benzodiazepines.

Do not administer faster than 150mg/min since this may result in hypotension

j. If cerebrospinal fluid (CSF) is identified leaking from the ears and/or nose, elevate the head 30-60 degrees if the casualty's other injuries permit and the casualty is hemodynamically stable.

k. If the casualty exhibits signs of increased ICP and is hemodynamically stable, consider elevating the head 30 degrees to improve venous outflow from the brain and decrease ICP. Do not elevate the head of a hypovolemic casualty since this will reduce cerebral blood flow.

l. Consider sedation of severe TBI after definitive airway established with midazolam 1-2mg/hour IV/IO if no evidence of shock or hypotension.

m. Antibiotic prophylaxis for penetrating head trauma: Ertapenem (Invanz®) 1gm IV/IO OR Ceftriaxone (Rocephin®) 1gm IV/IO.

n. Ensure casualty is evacuated to a facility with a neurosurgeon available.

o. For non-severe head injuries, see ***Mild Traumatic Brain Injury (MTBI) Protocol (TMEP).***

9. Penetrating Eye Trauma

a. If a penetrating eye injury is noted or suspected:
- Perform a rapid field test of visual acuity and document findings.
- Cover the eye with a rigid eye shield (NOT a pressure patch.)
- Ensure that the 400 mg moxifloxacin tablet in the Combat Wound Medication Pack (CWMP) is taken if possible and that IV/IM antibiotics are given as outlined below if oral moxifloxacin cannot be taken.

10. Monitoring

a. Initiate advanced electronic monitoring if indicated and if monitoring equipment is available. All individuals with moderate/severe TBI should be monitored with pulse oximetry. Readings may be misleading in the settings of shock or marked hypothermia.

11. Analgesia

a. Analgesia on the battlefield should generally be achieved using one of three options:
- Option 1
  -Mild to Moderate Pain Casualty is still able to fight
  - TCCC Combat Wound Medication Pack (CWMP)
    * Tylenol – 650 mg bilayer caplet, 2 PO every 8 hours
    *Meloxicam - 15 mg PO once a day
- Option 2
  -Moderate to Severe Pain
  Casualty IS NOT in shock or respiratory distress AND
  Casualty IS NOT at significant risk of developing either condition
  - Oral transmucosal fentanyl citrate (OTFC) 800 µg
    * Place lozenge between the cheek and the gum
    * Do not chew the lozenge

- Option 3
  - Moderate to Severe Pain
    Casualty IS in hemorrhagic shock or respiratory distress OR
    Casualty IS at significant risk of developing either condition
    - Ketamine 50 mg IM or IN
      Or
    - Ketamine 20 mg slow IV or IO
      * Repeat doses q30min prn for IM or IN
      * Repeat doses q20min prn for IV or IO
      * End points: Control of pain or development of nystagmus (rhythmic back-and-forth movement of the eyes)

b. Treat per ***Nausea and Vomiting Protocol (TMEP)*** prn.

Analgesia notes

a. Casualties may need to be disarmed after being given OTFC or ketamine.

b. Document a mental status exam using the AVPU method prior to administering opioids or ketamine.

c. For all casualties given opioids or ketamine - monitor airway, breathing, and circulation closely.

d. Directions for administering OTFC:
- Recommend taping lozenge-on-a-stick to casualty's finger as an added safety measure OR utilizing a safety pin and rubber band to attach the lozenge (under tension) to the patient's uniform or plate carrier.
- Reassess in 15 minutes
- Add second lozenge, in other cheek, as necessary to control severe pain
- Monitor for respiratory depression and support respiratory drive

e. IV Morphine is an alternative to OTFC if IV access has been obtained
- 5 mg IV/IO
- Reassess in 10 minutes.
- Repeat dose every 10 minutes as necessary to control severe pain.
- Monitor for respiratory depression and support respiratory drive.

f. Naloxone (0.4 mg IV or IM) should be available when using opioid analgesics.

g. Both ketamine and OTFC have the potential to worsen severe TBI. The combat medic, corpsman, or PJ must consider this fact in his or her analgesic decision, but if the casualty is able to complain of pain, then the TBI is likely not severe enough to preclude the use of ketamine or OTFC.

h. Eye injury does not preclude the use of ketamine. The risk of additional damage to the eye from using ketamine is low and maximizing the casualty's chance for survival takes precedence if the casualty is in shock or respiratory distress or at significant risk for either.

i. Ketamine may be a useful adjunct to reduce the amount of opioids required to provide effective pain relief. It is safe to give ketamine to a casualty who has previously received morphine or OTFC. IV Ketamine should be given over 1 minute.

j. If respirations are noted to be reduced after using opioids or ketamine, provide ventilatory support with a bag-valve-mask or mouth-to-mask ventilations.

k. Ondansetron, 4 mg Orally Dissolving Tablet (ODT)/IV/IO/IM, every 8 hours as needed for nausea or vomiting. Each 8-hour dose can be repeated once at 15 minutes if nausea and vomiting are not improved. Do not give more than 8 mg in any 8-hour interval. Oral ondansetron is NOT an acceptable alternative to the ODT formulation.

l. Reassess - reassess - reassess!

12. Antibiotics: recommended for all open combat wounds

a. If able to take PO meds:
- Moxifloxacin (from the CWMP), 400 mg PO one a day

b. If unable to take PO (shock, unconsciousness):
- Erapenem, 1 g IV/IM once a day

13. Inspect and dress known wounds.

14. Check for additional wounds.

15. Burns

a. Facial burns, especially those that occur in closed spaces, may be associated with inhalation injury. Aggressively monitor airway status and oxygen saturation in such patients and consider early surgical airway for respiratory distress or oxygen desaturation.

b. Estimate total body surface area (TBSA) burned to the nearest 10% using the Rule of Nines.

c. Cover the burn area with dry, sterile dressings. For extensive burns (>20%), consider placing the casualty in the Heat-Reflective Shell or Blizzard Survival Blanket from the Hypothermia Prevention Kit in order to both cover the burned areas and prevent hypothermia.

d. Fluid resuscitation (USAISR Rule of Ten)
- If burns are greater than 20% of Total Body Surface Area, fluid resuscitation should be initiated as soon as IV/IO access is established. Resuscitation should be initiated with Lactated Ringer's, normal saline, or Hextend. If Hextend is used, no more than 1000 ml should be given, followed by Lactated Ringer's or normal saline as needed.
- Initial IV/IO fluid rate is calculated as %TBSA x 10cc/hr for adults weighing 40- 80 kg.
- For every 10 kg ABOVE 80 kg, increase initial rate by 100 ml/hr.
- If hemorrhagic shock is also present, resuscitation for hemorrhagic shock takes precedence over resuscitation for burn shock. Administer IV/IO fluids per the USSOCOM TTPs in Section 6.

e. Analgesia in accordance with the USSOCOM TTPs in Section 11 may be administered to treat burn pain.

f. Prehospital antibiotic therapy is not indicated solely for burns, but antibiotics should be given per the USSOCOM TTPs in Section 12 if indicated to prevent infection in penetrating wounds.

g. All TCCC interventions can be performed on or through burned skin in a burn casualty.

h. Burn patients are particularly susceptible to hypothermia. Extra emphasis should be placed on barrier heat loss prevention methods.

i. If trained, consider escharotomy for: Circumferential extremity burns with compromised circulation and/or Circumferential thoracic burns with compromised ventilation. Limit escharotomy incision to depth of burn.

j. Splint burned hands and feet in position of function with dressings separating digits.

k. Consider aggressive pain management for critical burn patients.

l. Initiate aggressive hypothermia prevention management, especially for extensive burns.

16. Splint fractures and re-check pulses.

a. Severe and extensive crush injuries may be seen in patients trapped under an overturned vehicle or in a collapsed structure such as a bombed building.

b. Entrapment may be prolonged due to the requirement for specialized rescue equipment.

c. See ***Crush Syndrome Protocol (TMEP)***.

17. Abdominal evisceration: Control any visible hemorrhage from bowel using approved hemostatic agent or gauze. Irrigate gross debris off of exposed bowel. Attempt to gently reduce bowel back into abdominal cavity. If bowel is reduced, approximate skin (sutures or staples) and cover abdominal wound with dressing. If bowel is unable to be reduced, cover bowel with moist dressing.

18. Communication

a. Communicate with the casualty if possible. Encourage, reassure and explain care.

b. Communicate with tactical leadership as soon as possible and throughout casualty treatment as needed. Provide leadership with casualty status and evacuation requirements to assist with coordination of evacuation assets.

c. Communicate with the evacuation system (the Patient Evacuation Coordination Cell) to arrange for TACEVAC. Communicate with medical providers on the evacuation asset if possible and relay mechanism of injury, injuries sustained, signs/symptoms, and treatments rendered. Provide additional information as appropriate.

19. Cardiopulmonary resuscitation (CPR)

a. Resuscitation on the battlefield for victims of blast or penetrating trauma who have no pulse, no ventilations, and no other signs of life will not be successful and should not be attempted. However, casualties with torso trauma or polytrauma who have no pulse or respirations during TFC should have bilateral needle decompression performed to ensure they do not have a tension pneumothorax prior to discontinuation of care. The procedure is the same as described in Section 5.a. above.

b. CPR may be considered depending on the tactical situation in certain types of casualties: Severe hypothermia; Chemical warfare agent/toxic exposures (if appropriate antidotes are available); Crush syndrome (if ACLS treatments for hyperkalemia are available); and Electrocution.

20. Documentation of Care

a. Document clinical assessments, treatments rendered, and changes in the casualty's status on a TCCC Casualty Card (DD Form 1380). Forward this information with the casualty to the next level of care.

21. Prepare for Evacuation.

a. Complete and secure TCCC Card (DD 1380) to casualty.

b. Secure all loose ends of bandages and wraps.

c. Secure hypothermia prevention wraps/blankets/straps.

d. Secure litter straps as required. Consider additional padding for long evacuations.

e. Provide instructions to ambulatory patients as needed.

f. Stage casualties for evacuation in accordance with unit standard operating procedures.

g. Maintain security at the evacuation point in accordance with unit standard operating procedures.

h. Ensure proper handover and transition of care to receiving medic and/or facility if possible.

Basic Management Plan for Tactical Evacuation* Care

* The term “Tactical Evacuation” includes both Casualty Evacuation (CASEVAC) and Medical Evacuation (MEDEVAC) as defined in Joint Publication 4-02.

1. Transition of Care

a. Tactical force should establish HLZ or evacuation point and maintain security of site while moving casualties to evacuation platform and assist loading as tactical situation permits.

b. Tactical force personnel/medic should attempt to communicate patient information and status to TACEVAC personnel if possible. The minimum information communicated should include Stable or Unstable, Injuries identified, Treatments rendered.

c. TACEVAC personnel triage casualties onto evacuation platform as required.

d. Secure casualties in evacuation platform in accordance with unit policies, configurations and safety requirements.

e. TACEVAC personnel re-assess/identify all previous interventions and treatments.

2. Massive Hemorrhage

a. Assess for unrecognized hemorrhage and control all sources of bleeding. If not already done, use a CoTCCC-recommended limb tourniquet to control life-threatening external hemorrhage that is anatomically amenable to tourniquet use or for any traumatic amputation. Apply directly to the skin 2-3 inches above the bleeding site. If bleeding is not controlled with the first tourniquet, apply a second tourniquet side-by-side with the first.

b. For compressible hemorrhage not amenable to limb tourniquet use or as an adjunct to tourniquet removal, use Combat Gauze™ as the CoTCCC hemostatic dressing of choice.
- Alternative hemostatic adjuncts:
  - Celox Gauze® or
  - ChitoGauze® or
  - XStat™ (Best for deep, narrow-tract junctional wounds)
  - iTClamp (may be used alone or in conjunction with a hemostatic dressing or XStat)
- Hemostatic dressings should be applied with at least 3 minutes of direct pressure (optional for XStat™). Each dressing works differently, so if one fails to control bleeding, it may be removed and a fresh dressing of the same type or a different type applied. (Note: XStat™ is not to be removed in the field, but additional XStat™, other hemostatic adjuncts, or trauma dressings may be applied over it.)
- If the bleeding site is amenable to use of a junctional tourniquet, immediately apply a CoTCCC-recommended junctional tourniquet. Do not delay in the application of the junctional tourniquet once it is ready for use. Apply hemostatic dressings with direct pressure if a junctional tourniquet is not available or while the junctional tourniquet is being readied for use.

c. For external hemorrhage of the head and neck where the wound edges can be easily re-approximated, the iTClamp may be used as a primary option for hemorrhage control. Wounds should be packed with a hemostatic dressing or XStat, if appropriate, prior to iTClamp application.
- The iTClamp does not require additional direct pressure, either when used alone or in combination with other hemostatic adjuncts.
- If the iTClamp is applied to the neck, perform frequent airway monitoring and evaluate for an expanding hematoma that may compromise the airway. Consider placing a definitive airway if there is evidence of an expanding hematoma.
- DO NOT APPLY on or near the eye or eyelid (within 1cm of the orbit).

3. Airway Management

a. Conscious casualty with no airway problem identified:

- No airway intervention required

b. Unconscious casualty without airway obstruction:
- Place casualty in the recovery position
- Chin lift or jaw thrust maneuver
- Nasopharyngeal airway or
- Extraglottic airway

c. Casualty with airway obstruction or impending airway obstruction:
- Allow a conscious casualty to assume any position that best protects the airway, to include sitting up.
- Use a chin lift or jaw thrust maneuver
- Use suction if available and appropriate
- Nasopharyngeal airway or
- Extraglottic airway (if the casualty is unconscious)
- Place an unconscious casualty in the recovery position. Protect spine in blunt and blast trauma patients.

d. If the previous measures are unsuccessful, assess the tactical and clinical situations, the equipment at hand, and the skills and experience of the person providing care, and then select one of the following airway interventions:

- Supraglottic airway, or
- Endotracheal intubation or
- Perform a surgical cricothyroidotomy using one of the following:
  - Cric-Key technique ~~(Preferred option)~~
  - Bougie-aided open surgical technique using a flanged and cuffed airway cannula of less than 10mm outer diameter, 6-7mm internal diameter, and 5-8 cm of intra-tracheal length
  - Standard open surgical technique using a flanged and cuffed airway cannula of less than 10mm outer diameter, 6-7mm internal diameter and 5-8cm of intra-tracheal length ~~(Least desirable option)~~
- Use lidocaine if the casualty is conscious.

d. Verify correct airway placement and patency:
- Self-inflating bulb syringe (e.g., Esophageal Intubation Detector)
- End tidal CO_2 detector (capnography)
- In austere or tactical settings where end tidal CO_2 detection and monitoring is not available or accessible, visualization of the tube passing through the glottis opening and auscultation of epigastric and lung sounds may be used.
- Do not rely on auscultation or visual misting in the ET tube to confirm placement.

e. An endotracheal tube inducer (ETTI - bougie) may be advanced through the tube to assess for “hang up” in the bronchial tree or tracheal ring clicks. Advancement of the ETTI without opposition suggests esophageal placement.

f. Do not rely on the casualty to breathe independently through the airway device. Support ventilation using a bag valve mask (BVM) device. Automatic ventilation devices are an acceptable alternative if available.

g. Cervical spine stabilization is not necessary for casualties who have sustained only penetrating trauma.

f. Monitor the hemoglobin oxygen saturation in casualties to help assess airway patency. Use capnography monitoring in this phase of care if available.

g. Always remember that the casualty’s airway status may change over time and requires frequent reassessment.

* The i-gel is the preferred extraglottic airway because its gel-filled cuff makes it simpler to use and avoids the need for cuff inflation and monitoring. If an extraglottic airway with an air-filled cuff is used, the cuff pressure must be monitored to avoid overpressurization, especially during TACEVAC on an aircraft with the accompanying pressure changes.
* Extraglottic airways will not be tolerated by a casualty who is not deeply unconscious. If an unconscious casualty without direct airway trauma needs an airway intervention, but does not tolerate an extraglottic airway, consider the use of a nasopharyngeal airway.
* For casualties with trauma to the face and mouth, or facial burns with suspected inhalation injury, nasopharyngeal airways and extraglottic airways may not suffice and a surgical cricothyroidotomy may be required.
* Surgical cricothyroidotomies should not be performed on unconscious casualties who have no direct airway trauma unless use of a nasopharyngeal airway and/or an extraglottic airway have been unsuccessful in opening the airway.

4. Respiration / Breathing

a. In a casualty with progressive respiratory distress and known or suspected torso trauma, consider a tension pneumothorax and decompress the chest on the side of the injury with a 14-gauge, 3.25 inch needle/catheter unit inserted in the second intercostal space at the midclavicular line. Ensure that the needle entry into the chest is not medial to the nipple line and is not directed towards the heart. An acceptable alternate site is the 4th or 5th intercostal space at the anterior axillary line (AAL).

b. Consider chest tube insertion if no improvement and/or long transport is anticipated.

c. Initiate pulse oximetry if not previously done. All individuals with moderate/severe TBI should be monitored with pulse oximetry. Readings may be misleading in the settings of shock or marked hypothermia.

d. Most combat casualties do not require supplemental oxygen, but administration of oxygen may be of benefit for the following types of casualties:
- Low oxygen saturation by pulse oximetry
- Injuries associated with impaired oxygenation
- Unconscious casualty
- Casualty with TBI (maintain oxygen saturation > 90%)
- Casualty in shock
- Casualty at altitude
- Known or suspected smoke inhalation

e. All open and/or sucking chest wounds should be treated by immediately applying a vented chest seal to cover the defect. If a vented chest seal is not available, use a non-vented chest seal. Monitor the casualty for the potential development of a subsequent tension pneumothorax. If the casualty develops increasing hypoxia, respiratory distress, or hypotension and a tension pneumothorax is suspected, treat by burping or removing the dressing or by needle decompression.

5. Circulation

a. Bleeding
- A pelvic binder should be applied for suspected pelvic fracture:
  - Severe blunt force or blast injury with one or more of the following indications:
    - Pelvic pain
    - Any major lower limb amputation or near amputation
    - Physical exam findings suggestive of a pelvic fracture
    - Unconsciousness
    - Shock

- Reassess prior tourniquet application. Expose the wound and determine if a tourniquet is needed. If it is needed, replace any limb tourniquet placed over the uniform with one applied directly to the skin 2-3 inches above the bleeding site. Ensure that bleeding is stopped. If there is no traumatic amputation, a distal pulse should be checked. If bleeding persists or a distal pulse is still present, consider additional tightening of the tourniquet or the use of a second tourniquet side-by-side with the first to eliminate both bleeding and the distal pulse. If the reassessment determines that the prior tourniquet was not needed, then remove the tourniquet and note time of removal on the TCCC Casualty Card.
- Limb tourniquets and junctional tourniquets should be converted to hemostatic or pressure dressings as soon as possible if three criteria are met: the casualty is not in shock; it is possible to monitor the wound closely for bleeding; and the tourniquet is not being used to control bleeding from an amputated extremity. Every effort should be made to convert tourniquets in less than 2 hours if bleeding can be controlled with other means. Do not remove a tourniquet that has been in place more than 6 hours unless close monitoring and lab capability are available.
- Expose and clearly mark all tourniquets with the time of tourniquet application. Note tourniquets applied and time of application; time of re-application; time of conversion; and time of removal on the TCCC Casualty Card. Use a permanent marker to mark on the tourniquet and the casualty card.

b. IV Access

- Reassess need for IV access.

- IV or IO access is indicated if the casualty is in hemorrhagic shock or at significant risk of shock (and may therefore need fluid resuscitation), or if the casualty needs medications, but cannot take them by mouth.
  - An 18-gauge IV or saline lock is preferred.
  - If vascular access

c. Tranexamic Acid (TXA)

- If a casualty is anticipated to need significant blood transfusion (for example: presents with hemorrhagic shock, one or more major amputations, penetrating torso trauma, or evidence of severe bleeding):
  - Administer 1 gram of tranexamic acid in 100 mL Normal Saline or Lactated Ringers over 10 minutes as soon as possible but NOT later than 3 hours after injury. When given, TXA should be administered over 10 minutes by IV infusion.
  - Begin second infusion of 1 gm TXA after Hextend or other fluid treatment.

Do not administer tranexamic acid (TXA) (Cyklokapron®) IV push since this may result in hypotension.

Do not administer tranexamic acid (TXA) (Cyklokapron®) through the same IV line as blood products (including recombinant Factor VIIa (NovoSeven®) or fibrinogen) or Hextend®.

  - After administration of the first dose, mark on chest wall “1gm TXA given”. After administration of the second dose, change chest wall marking to “2 x 1gm TXA given”.

d. Fluid resuscitation

- Assess for hemorrhagic shock (altered mental status in the absence of brain injury and/or weak or absent radial pulse).
- The resuscitation fluids of choice for casualties in hemorrhagic shock, listed from most to least preferred, are: whole blood*; plasma, RBCs and platelets in a 1:1:1 ratio*; plasma and RBCs in a 1:1 ratio; plasma or RBCs alone; Hextend; and crystalloid (Lactated Ringer’s or Plasma-Lyte A). (NOTE: Hypothermia prevention measures [Section 7] should be initiated while fluid resuscitation is being accomplished.)
  - If not in shock:
    - No IV fluids are immediately necessary.
    - Fluids by mouth are permissible if the casualty is conscious and can swallow.

- If in shock and blood products are available under an approved command or theater blood product administration protocol:
  - Resuscitate with whole blood*, or, if not available
  - Plasma, RBCs and platelets in a 1:1:1 ratio*, or, if not available
  - Plasma and RBCs in a 1:1 ratio, or, if not available
  - Reconstituted dried plasma, liquid plasma or thawed plasma alone or RBCs alone
  - Reassess the casualty after each unit. Continue resuscitation until a palpable radial pulse, improved mental status or systolic BP of 80-90 is present.
- If in shock and blood products are not available under an approved command or theater blood product administration protocol due to tactical or logistical constraints:
  - Resuscitate with Hextend, or if not available
  - Lactated Ringer's or Plasma-Lyte A
  - Reassess the casualty after each 500 ml IV bolus.
  - Continue resuscitation until a palpable radial pulse, improved mental status, or systolic BP of 80-90 mmHg is present.
  - Discontinue fluid administration when one or more of the above end points has been achieved.

- If a casualty with an altered mental status due to suspected TBI has a weak or absent radial pulse, resuscitate as necessary to restore and maintain a normal radial pulse. If BP monitoring is available, maintain a target systolic BP of at least 90 mmHg.
- Reassess the casualty frequently to check for recurrence of shock. If shock recurs, recheck all external hemorrhage control measures to ensure that they are still effective and repeat the fluid resuscitation as outlined above.

* Currently, neither whole blood nor apheresis platelets collected in theater are FDA-compliant because of the way they are collected. Consequently, whole blood and 1:1:1 resuscitation using apheresis platelets should be used only if all the FDA-compliant blood products needed to support 1:1:1 resuscitation are not available, or if 1:1:1 resuscitation is not producing the desired clinical effect.

6. Traumatic Brain Injury

a. Casualties with moderate/severe TBI should be monitored for:
- Decreases in level of consciousness
- Pupillary dilation
- SBP should be >90 mmHg
- O2 sat > 90
- Hypothermia
- PCO2 (If capnography is available, maintain between 35-40 mmHg)
- Penetrating head trauma (if present, administer antibiotics)
- Assume a spinal (neck) injury until cleared.

b. Unilateral pupillary dilation accompanied by a decreased level of consciousness may signify impending cerebral herniation; if these signs occur, take the following actions to decrease intracranial pressure:
- Administer 250 mL of 3 or 5% hypertonic saline bolus.
- Elevate the casualty's head 30 degrees.
- Hyperventilate the casualty.
  - Respiratory rate 20
  - Capnography should be used to maintain the end-tidal CO2 between 30-35 mmHg
  - The highest oxygen concentration (FIO2) possible should be used for hyperventilation.

c. Continue to prevent hypotension and hypoxia.

d. Administer 3-5% Hypertonic Saline 250mL IV/IO for severe TBI if not already done or patient is continuing to deteriorate rapidly as per Tactical Field Care Section 10 (head injury).

e. Controlled hyperventilation may be considered as a temporizing measure for evidence of increasing intracranial pressure (ICP) and herniation (e.g., deteriorating mental status, unequal pupils, posturing, and irregular respiratory pattern). If end tidal CO_2 monitor is available, ventilate to achieve pCO_2 of 30-35 mmHg. If end tidal CO_2 monitor is not available, ventilate at a rate of 20 per minute and a tidal volume of approximately 500mL.

f. Seizure management. Diazepam (Valium®) 5-10mg IV/IO q 5 min to maximum dose of 20mg OR Midazolam 5mg IV/IO q 5 min (no maximum dose). Monitor casualty closely for apnea when administering benzodiazepines. Fosphenytoin (Cerebyx®) 18mg/kg IV/IO at 100-150mg/min if available for seizures refractory to benzodiazepines.

Do not administer faster than 150mg/min since this may result in hypotension.

Ensure that the line used for infusion is completely free of glucose, or the fosphenytoin (Cerebyx®) will precipitate in the line

*Notes:
Do not hyperventilate unless signs of impending herniation are present.
Casualties may be hyperventilated with oxygen using the bag-valve-mask technique.

7. Prevention of hypothermia

a. Minimize casualty's exposure to the elements. Keep protective gear on or with the casualty if feasible.

b. Replace wet clothing with dry if possible. Get the casualty onto an insulated surface as soon as possible.

c. Apply the Ready-Heat Blanket from the Hypothermia Prevention and Management Kit (HPMK) to the casualty's torso (not directly on the skin) and cover the casualty with the Heat-Reflective Shell (HRS).

d. If an HRS is not available, the previously recommended combination of the Blizzard Survival Blanket and the Ready Heat blanket may also be used.

e. If the items mentioned above are not available, use dry blankets, poncho liners, sleeping bags, or anything that will retain heat and keep the casualty dry.

f. Use a portable fluid warmer capable of warming all IV fluids including blood products.

g. Protect the casualty from wind if doors must be kept open.

h. Utilize heating system on evacuation platform.

8. Penetrating Eye Trauma

a. If a penetrating eye injury is noted or suspected:
- Perform a rapid field test of visual acuity and document findings.
- Cover the eye with a rigid eye shield (NOT a pressure patch.)
- Ensure that the 400 mg moxifloxacin tablet in the Combat Wound Medication Pack (CWMP) is taken if possible and that IV/IM antibiotics are given as outlined below if oral moxifloxacin cannot be taken.

9. Monitoring

a. Institute pulse oximetry and other advanced electronic monitoring of vital signs, if indicated. All individuals with moderate/severe TBI should be monitored with pulse oximetry. Readings may be misleading in the settings of shock or marked hypothermia.

10. Analgesia

a. Analgesia on the battlefield should generally be achieved using one of three options:
- Option 1
  -Mild to Moderate Pain Casualty is still able to fight

◦TCCC Combat Wound Medication Pack (CWMP)
* Tylenol – 650 mg bilayer caplet, 2 PO every 8 hours
*Meloxicam - 15 mg PO once a day

- Option 2
  - Moderate to Severe Pain
    Casualty IS NOT in shock or respiratory distress AND
    Casualty IS NOT at significant risk of developing either condition
    ◦ Oral transmucosal fentanyl citrate (OTFC) 800 µg
    * Place lozenge between the cheek and the gum
    * Do not chew the lozenge
- Option 3
  - Moderate to Severe Pain
    Casualty IS in hemorrhagic shock or respiratory distress OR
    Casualty IS at significant risk of developing either condition
    ◦ Ketamine 50 mg IM or IN
    Or
    ◦ Ketamine 20 mg slow IV or IO
    * Repeat doses q30min prn for IM or IN
    * Repeat doses q20min prn for IV or IO
    * End points: Control of pain or development of nystagmus (rhythmic back-and-forth movement of the eyes)

b. Treat per ***Nausea and Vomiting Protocol (TMEP)*** prn.

* Analgesia notes

a. Casualties may need to be disarmed after being given OTFC or ketamine.

b. Document a mental status exam using the AVPU method prior to administering opioids or ketamine.

c. For all casualties given opioids or ketamine - monitor airway, breathing, and circulation closely

d. Directions for administering OTFC:
- Recommend taping lozenge-on-a-stick to casualty's finger as an added safety measure OR utilizing a safety pin and rubber band to attach the lozenge (under tension) to the patient's uniform or plate carrier.
- Reassess in 15 minutes
- Add second lozenge, in other cheek, as necessary to control severe pain
- Monitor for respiratory depression

e. IV Morphine is an alternative to OTFC if IV access has been obtained
- 5 mg IV/IO
- Reassess in 10 minutes.
- Repeat dose every 10 minutes as necessary to control severe pain.
- Monitor for respiratory depression.

f. Naloxone (0.4 mg IV or IM) should be available when using opioid analgesics.

g. Both ketamine and OTFC have the potential to worsen severe TBI. The combat medic, corpsman, or PJ must consider this fact in his or her analgesic decision, but if the casualty is able to complain of pain, then the TBI is likely not severe enough to preclude the use of ketamine or OTFC.

h. Eye injury does not preclude the use of ketamine. The risk of additional damage to the eye from using ketamine is low and maximizing the casualty's chance for survival takes precedence if the casualty is in shock or respiratory distress or at significant risk for either.

i. Ketamine may be a useful adjunct to reduce the amount of opioids required to provide effective pain relief. It is safe to give ketamine to a casualty who has previously received morphine or OTFC. IV Ketamine should be given over 1 minute.

j. If respirations are noted to be reduced after using opioids or ketamine, provide ventilatory support with a bag-valve-mask or mouth-to-mask ventilations.

k. Ondansetron, 4 mg ODT/IV/IO/IM, every 8 hours as needed for nausea or vomiting. Each 8-hour dose can be repeated once at 15 minutes if nausea and vomiting are not improved. Do not give more than 8 mg in any 8-hour interval. Oral ondansetron is NOT an acceptable alternative to the ODT formulation.

l. Reassess - reassess - reassess!

11. Antibiotics: recommended for all open combat wounds

a. If able to take PO:
- Moxifloxacin, 400 mg PO one a day

b. If unable to take PO (shock, unconsciousness):
- Ertapenem, 1 g IV/IM once a day

12. Inspect and dress known wounds.

13. Check for additional wounds.

14. Burns

a. Facial burns, especially those that occur in closed spaces, may be associated with inhalation injury. Aggressively monitor airway status and oxygen saturation in such patients and consider early surgical airway for respiratory distress or oxygen desaturation.

b. Estimate total body surface area (TBSA) burned to the nearest 10% using the Rule of Nines.

c. Cover the burn area with dry, sterile dressings. For extensive burns (>20%), consider placing the casualty in the Heat-Reflective Shell or Blizzard Survival Blanket from the Hypothermia Prevention Kit in order to both cover the burned areas and prevent hypothermia.

d. Fluid resuscitation (USAISR Rule of Ten)
- If burns are greater than 20% of Total Body Surface Area, fluid resuscitation should be initiated as soon as IV/IO access is established. Resuscitation should be initiated with Lactated Ringer's, normal saline, or Hextend. If Hextend is used, no more than 1000 ml should be given, followed by Lactated Ringer's or normal saline as needed.
- Initial IV/IO fluid rate is calculated as %TBSA x 10cc/hr for adults weighing 40- 80 kg.
- For every 10 kg ABOVE 80 kg, increase initial rate by 100 ml/hr.
- If hemorrhagic shock is also present, resuscitation for hemorrhagic shock takes precedence over resuscitation for burn shock. Administer IV/IO fluids per the TTPs in Section 5d.

e. Analgesia in accordance with the TTPs in Section 10 may be administered to treat burn pain.

f. Prehospital antibiotic therapy is not indicated solely for burns, but antibiotics should be given per the TTPs in Section 11 if indicated to prevent infection in penetrating wounds.

g. All TTPs can be performed on or through burned skin in a burn casualty.

h. Burn patients are particularly susceptible to hypothermia. Extra emphasis should be placed on barrier heat loss prevention methods and IV fluid warming in this phase.

17. Reasses fractures and re-check pulses.

18. Communication

a. Communicate with the casualty if possible. Encourage, reassure and explain care.

b. Communicate with next level of care. Relay mechanism of injury, injury types, signs/symptoms, and treatments rendered. Provide additional information as possible.

19. CPR in TACEVAC Care

a. Casualties with torso trauma or polytrauma who have no pulse or respirations during TACEVAC should have bilateral needle decompression performed to ensure they do not have a tension pneumothorax. The procedure is the same as described in Section 4a above.

b. CPR may be attempted during this phase of care if the casualty does not have obviously fatal wounds and will be arriving at a facility with a surgical capability within a short period of time. CPR should not be done at the expense of compromising the mission or denying lifesaving care to other casualties.

20. Documentation of Care

a. Document clinical assessments, treatments rendered, and changes in the casualty's status on a TCCC Casualty Card (DD Form 1380). Forward this information with the casualty to the next level of care.

21. Air evacuation altitude considerations:

a. Monitor air pressure in extremity air splints during altitude changes.

b. DO NOT replace air with saline in endotracheal tube cuffs. Only use air in the endotracheal tube cuffs. Use a cuff manometer to monitor cuff pressures during air evacuation and adjust volumes as needed.

Prolonged Field Care Considerations

1. The unique nature of SOF missions may require prolonged field care (PFC) lasting hours to days before evacuation to definitive care. PFC is defined as field medical care, applied beyond 'doctrinal planning time-lines', in order to decrease patient mortality and morbidity. It utilizes limited resources, and is sustained until the patient arrives at the next appropriate level of care. Identify the potential for PFC during mission planning in order to prepare increased amounts of medical supplies (e.g., carried on vehicles) and/or resupply bundles. Ruck-Truck-House-Plane is an example operational framework for planning increased levels of medical equipment staging (see Table 1)

Table 1.	Monitoring	Resuscitate	Vent/oxy	Airway	ETC…
RUCK	Pulse ox, BP Cuff, Steth	NS/FWB	BVM with PEEP	SGA/cric	…
TRUCK	Monitor	NS/Plasma-Lyte A pH 7.4/FWB kit	BVM with PEEP/O2 bottles	SGA/cric with ketamine drip	…
HOUSE	Monitor	LR cases/ 3% hypertonic saline/FWB	O2 concentrator/ bottles	RSI capability?	…
PLANE	Monitor	NS/LR	BVM with PEEP	SGA/cric with ketamine drip	…

Example of PFC equipment planning. Example only: adjust based on mission planning & capabilities.

Table 2. Ten Capabilities of Prolonged Field Care (Adapt based upon unit training, capabilities and mission)			
PFC Tasks	**Minimum**	**Better**	**Best**
1. Monitor the patient to create a useful vital sign trend	Blood pressure cuff, stethoscope, pulse oximetry, Foley catheter (measure urine output), mental status and understanding of vital signs	Add capnometry	Vital signs monitor to provide hands-free vital signs data at regular intervals

	interpretation. Flowchart vitals.		
2. Resuscitate the patient beyond crystalloid/colloid infusion	Field fresh whole blood (FWB) transfusion kits, extra Eldon typing cards	Maintenance crystalloids also prepared for a major burn and/or closed head injury resusci-tation (two to three cases of lactated Ringer's solution or PlasmaLyte A pH 7.4; hypertonic saline); consider adding lyophilized plasma as available; fluid warmer	Maintain a stock of packed red blood cells, fresh frozen plasma, and have type-specific donors identified for immediate FWB draw.
3.Ventilate/oxygenate the patient	Provide positive end-expiratory pressure (PEEP) via bag-valve mask (you cannot ventilate a patient in the PFC setting [prolonged ventilation] without PEEP or they will be at risk of developing acute respiratory distress syndrome)	Provide supplemental oxygen (O2) via an oxygen concentrator	Portable ventilator (i.e., Eagle Impact ventilator [Zoll Medical Corp., http://www.impact instrumentation.com] or similar) with supplemental O2
4. Gain definitive control of the patient's airway with an inflated cuff in the trachea (and be able to keep the patient comfortable)	Medic is prepared for a ketamine cricothyrotomy	Add ability to provide long-duration sedation	Add a responsible rapid-sequence intubation capability with subsequent airway maintenance skills, in addition to providing long-term sedation (to include suction and paralysis with adequate sedation)
5. Use sedation/pain control effectively	Provide ketamine/opiate analgesics titrated intravenously	Trained to sedate with ketamine (Ketalar®) (and adjunctive midazolam as needed)	Experienced with and maintains currency in long-term sedation practice using intravenous morphine, ketamine, midazolam, fentanyl, etc.
6. Use serial physical examinations/diagnostic measures to gain awareness of potential problems/Create a prioritized problem/treatment plan	Uses physical examination without advanced diagnostics, maintain awareness of potential unseen injuries (abdominal bleed, head injury, and so forth)	Trained to use advanced diagnostics such as ultrasound, point-of-care laboratory testing, and so forth	Experienced in both
7. Provide nursing/hygiene/comfort measures	Ensure the patient is clean, warm, dry, padded, catheterized, and provides basic wound care	Elevate head of bed, debride wounds, perform washouts, wet-to-dry dressings, decompress stomach	Experienced in both
8. Perform advanced surgical interventions	Chest tube, cricothyrotomy	Fasciotomy, escharotomy, wound	Experienced in both

		debridement, amputation, etc.	
9. Perform telemedicine consult	Make reliable communications, present patient, pass trends of key vital signs	Add laboratory findings and ultrasound images; working relationship with consultant	Video Teleconference
10. Prepare the patient for flight	Be familiar with physiologic stressors of flight. Prepare patient appropriately.	Trained in critical care transport	Experienced in critical care transport

Prolonged Field Care Card

Day																										D	Checklist	
Hour																										H	Reassess Tx	
Minute																										M	Expose	
BP Systolic V Diastolic ^ Temp ●	200																									200	Detailed Exam	
	190																									190	Send MIST Report	
	180																									180	Monitors	
	170																									170	2nd IV/IO	
	160																									160	Analgesia	
	150																									150	Sedation	
	140																									140	NG / OG	
	130																									130	Upgrade Airway	
	120																									120	Post Cric Checklist	
	110																									110	Vent w/ PEEP	
SPO2 O	100																									100	Hypothermia Tx	
	95																									95	Ultrasound eFast	
	90																									90	Fluid Challenge	
Pulse Δ	85																									85	1st TXA dose (<3hrs)	
	80																									80	Blood Type Card	
	75																									75	FWB Transfusion	
	70																									70	Convert TQ <4hrs	
	65																									65	Foley / Bladder Tap	
	60																									60	Adjust Vent Settings	
	55																									55	UA Dipstick	
	50																									50	Clear C-Spine	
ETCO2 ■	45																									45	Position Pad Patient	
	40																									40	Peripheral Pulses	
	35																									35	Compartment Syndrome	
	30																									30	Escharotomy	
	25																									25	GCS / Neuro / MACE	
Respirations ◊	20																									20	Reduce / Splint Fx	
	15																									15	DVT Prophylaxis	
	10																									10	Antiboitic War Wound Tx	
	5																									5	Tetanus	
	0																									0	Teleconsult	
Output																											Labs	
Fluid Input																											X-Ray / Imaging	
Pain scale																											PreOp Eval	
AVPU																											Debridement	
Eye response	4																										Post Op	
Oral Response	5																											
Motor Response	6																											
GCS Total	15																											
Drug:	Dose																										Reminders	
																											Flush Saline Locks	
Drug:	Dose																										Vitals q1h	
																											Reposition q2hrs (30° Each side)	
Drug:	Dose																										Change Blood Tube q4hrs	
																											Oral Care / Hygeine q4hrs	
Drug:	Dose																										Foley Care q8hrs	
																											Sponge Bath q8hrs	
Drug:	Dose																										Change IV Bag q24hrs	
																											Change Foley Cath q72hrs	
Drug:	Dose																										Change IV Lines q72hrs	
																											Change HME q72hrs	

Prolonged Field Care Card (Front)

*see PFCare.org for current version

Prolonged Field Care Card

Name:	Date:	Time:	Weight:	Blood type:	EVAC Category:

S:

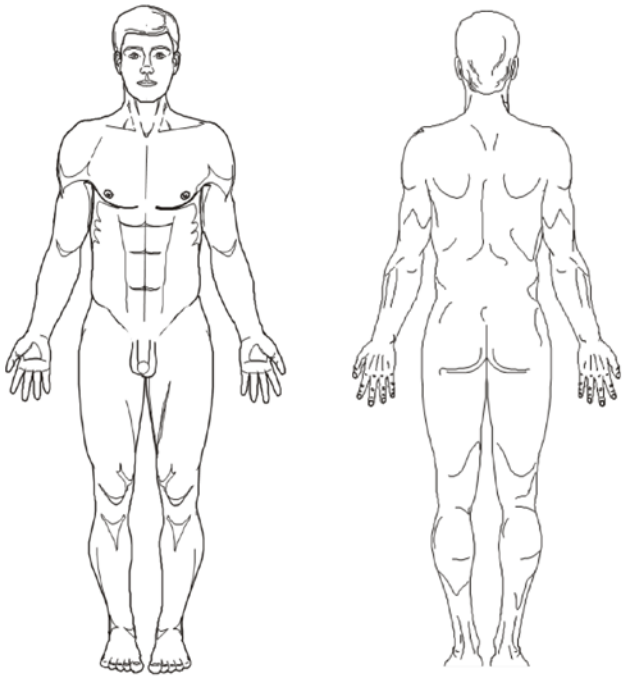
A:

M:

P:

L:

E:



MOI

	Injuries / illness / problems	Treatment plan
1		
2		
3		
4		
5		
6		

TQ 1 time on:	TQ 2 time on:	TQ 3 time on:	TQ 4 time on:	TXA Dose 1 on:
TQ 1 Converted:	TQ 2 Converted:	TQ 3 Converted:	TQ 4 Converted:	TXA Dose 2 on:

Notes:

Telemedicine Call Script

This is _____, an_____ (Job Position)
I have a patient with _____ who I
think has_____ and I
need _____ Chief
Complaint_____ Brief
History_____ Vitals
HR_____ RR_____ BP_____ Temp_____ Pulse
Ox_____ UOP _____ AVPU _____ Exam
Findings_____

Recommendations

Fluids/Meds_____
Interventions_____
Red Flags_____

2. Airway Management:
   a. Reverify airway patency and security in a consistent manner.
   b. Suction: Consider periodic suctioning of the oropharynx and endotracheal tube.
   c. Pulmonary toilet: Consider periodic saline flushes (2mL) to clear mucus/blood from ET tube.
   d. Local wound care at cricothyroidotomy site if applicable.
   e. Use HME filter in dusty or cold environments
   f. Monitor tube cuff pressure during elevation change. DO NOT replace air in the cuff with saline. Only use air in the endotracheal tube cuffs. Use a cuff manometer to monitor cuff pressures during air evacuation and adjust volumes as needed.

3. Respiratory Management:
   a. Place a small gauge thoracostomy device or chest tube placement if casualty required needle decompression previously.
   b. Apply negative pressure to chest tube if available, not exceeding -20cm water pressure.
   c. Consider rib blocks for pain management.
   d. If available, administer oxygen to maintain O_2 saturation > 90% (>95% for TBI).
   e. If patient is being ventilated, maintain strict bagging cycles (1 breath every 6-8 seconds) and a tidal volume of approximately 500mL to allow for complete exhalation and avoid stacking breaths.
   f. Consider the use of a ventilator/assist device if available. If the device permits, add physiologic positive end-expiratory pressure PEEP (3-5cm water). If the device does not have PEEP, use a BVM with PEEP valve for any ventilation support over 20 mins.
   g. Consider sedation with midazolam 1-2mg/hr IV/IO in casualties requiring prolonged intubation/ventilation if no shock or hypotension.

4. Flail chest management:
   a. Monitor for developing hypoxia secondary to pulmonary contusions.
   b. Casualty may require positive pressure ventilation.
   c. Ensure adequate analgesia. Consider rib blocks for pain management.
   d. These casualties frequently fatigue and require intubation/definitive surgical airway.

5. Fluid management:
   a. Conscious: Instruct casualty to drink clear liquids up to 1L/hr; consider oral electrolyte supplementation if available.
   b. Unconscious: Insert Foley catheter and titrate IV/IO/NG/PR crystalloid fluids to maintain urine output of 30-50mL/hr.
      i. Clean water may be utilized in lieu of crystalloid for NG/PR infusion.
      ii. Maximum PR fluid infusion rate for stable patients is 200mL/hr.
      iii. Maximum PR fluid infusion rate for volume depleted patients is 500mL/hr.
   c. Critical burn (> 20% TBSA of 2^{nd}/3^{rd} degree burns):
      Consider teleconsultation.
      i. Insert Foley catheter.
      ii. Continue fluid resuscitation according to “The Rule of Ten”.
         1. Initial rate is 10mL per %TBSA /hr for a maximum casualty weight of 80kg.
         2. Add 100mL/hr to the rate for each 10kg above 80kg.
         3. Example: A 90kg casualty with 50% TBSA burn would receive an initial rate of (10mL x 50)/hr + 100mL/hr or 600mL/hr.
      iii. Adjust fluid rate to maintain urine output of 30-50mL/hr.
      iv. Oral fluid administration may be acceptable in burns up to 40% TBSA if crystalloid supplies are limited. Larger burns are associated with ileus and significantly decreased bowel absorption. Use WHO oral rehydration packets if available.

6. Wound care management:
   a. Irrigate and re-dress wounds (any potable water can be used for irrigation).
   b. Debride only **obviously** devitalized tissue.
   c. Change dressings every 24 hours. Consider converting to silver impregnated dressings to reduce frequency of dressing changes.
   d. Continue antibiotics. Repeat moxifloxacin (Avelox®) 400mg PO or ertapenem (Invanz®) 1gm IV/IO/IM every 24 hours.

7. Analgesia:
   a. See ***Procedural Analgesia Protocol (TMEP)*** for procedures.
   b. Consider local blocks for pain management.

8. Orthopedic/Compartment Syndrome management:
   a. Apply traction splints as required.
   b. Reassess fractures and splint in position of function.
   c. Check neurovascular status after any manipulation.
   d. Be suspicious of compartment syndrome in the following conditions:
      i. Fractures.
      ii. Crush injuries.
      iii. Vascular injuries.
      iv. Circumferential burns.
      v. Multiple penetrating injuries (fragmentation).
   e. Clinical signs of compartment syndrome:
      i. Pain out of proportion to injury.
      ii. Pain with passive motion of muscles in the involved compartment.
      iii. Pallor.
      iv. Paresthesias.
      v. Pulselessness

      Be aware that peripheral pulses are present in 90% of patients with compartment syndrome.

      Consider teleconsultation.
   f. Consider use of compartment pressure monitor if available and trained in its use.
   g. Increasing swelling, decreasing motion, and increasing pain not responsive to analgesics in the appropriate clinical setting should raise the possibility of a developing compartment syndrome.
   h. Compartment syndromes make take hours to develop. For patients with suspected compartment syndrome, reevaluate every 30 minutes for 2 hours, then every hour for 12 hours, then every 2 hours for 24 hours, then every 4-6 hours for 48 hours.
   i. Extremity compartment syndromes may occur in the thigh, lower leg/calf, foot, forearm, and hand.
   j. Compartment syndrome management:
      i. Maintain extremity at level of heart. **Do not elevate.**
      ii. Loosen encircling dressings.
      iii. Urgent evacuation.
   k. Fasciotomy:
      i. Only consider if evacuation is delayed 6 hours or longer and fasciotomy is within the scope of the treating medic/SO-ATP.
      ii. See ***Fasciotomy Protocol (TMEP)***.

9. Special blast injury considerations:
   a. Tympanic membranes:
      i. Inspect for perforation if possible.
      ii. Presume perforation in the setting of post-blast hearing loss.
      iii. Dexamethasone (Decadron®) 10mg IV/IO/IM/PO QD x 5 days for hearing loss if not contraindicated by other injuries.
   b. Lungs:
      i. Pulmonary overpressure may result in delayed lung injury.
      ii. Monitor patients closely for respiratory deterioration for at least 6 hours post-blast.
      iii. Sudden neurological deterioration in the setting of pulmonary blast injury may indicate an acute gas embolism and require evacuation to a facility with a hyperbaric chamber.
   c. Abdomen:
      i. Blast overpressure may result in bowel injury and delayed perforation.
      ii. Acute abdominal pain, especially with evidence of peritoneal irritation, within 72 hours of blast exposure should be presumed to be a bowel perforation. *See Abdominal Pain TMEP.*
   d. Spine: Patients involved in vehicular blasts or thrown by explosions are at high risk for spinal injury. Maintain a high index of suspicion for spinal injury, especially in unconscious patients.
   e. Neuro: Conduct serial neuro exams every 6 hours.

VIRTUAL CRITICAL CARE CONSULTATION (VC3) GUIDE – 17 JUN 2016 (v2.1)

To be used with Prolonged Field Care Card

1. Before calling, E-mail image of the casualty (wounds, environment, etc.), "capabilities" (back), & vital signs trends [redacted]
2. If call not answered, doc may be on another call, taking care of ICU patient:
   a) call next number on PACE, b) leave v-mail w/callback number, c) call back in 5 – 10 min.
3. If unable to provide information due to operational security, state so.

P: Commercial: [redacted] DSN: [redacted]
A: 210-222-BURN
C:
E:

This is _____ I am a (job/ position) _____
My best contact info is: _____
Intensivist number: _____Alternate e-mail: _____

*** *PAUSE POINT* ***

I am in/ at (location) _____My patient's name/ DOB/ SSN are _____
Anticipated evacuation time is (range) _____ I have a _____ year – old _____(sex)
With (injury[ies],problem[s]) _____
That occurred (time/ hours ago) _____
Who is (circle) stable/ unstable, getting better/ getting worse/ getting worse rapidly
Past medical/ surgical history is: _____
I need help with (*be specific if possible, i.e. "I need help reading this ECG," or "I need help stabilizing this patient," etc.*)
_____
KNOWN PROBLEMS, INJURIES: _____
_____
_____
_____
Other Consultants have recommended:

*** *PAUSE POINT, THEN* VITAL SIGNS ***

HR _____ BP _____ UOP (ml/hr, trend) _____
RR _____ SpO2 _____ Temp _____ MS (GCS/ AVPU) _____
EXAM: Neuro Ext/ MSK
Heart Pulses
Lungs Skin/ Wounds
Abd
Labs: ABG: Lactate: Other:

INTERVENTIONS DONE:

*** *PAUSE POINT, THEN* RECOMMENDATIONS ***

PRIORITY	SYSTEM/ PROBLEM	RECOMMENDATION
	Neuro/ problem 1	
	CV/ problem 2	
	Pulm/ problem 3	
	GI/ problem 4	
	Renal/ problem 5	
	Endocrine	
	MSK/ Wound	
	Tubes, lines, drains	
	Prophylaxis/ prevention	
	Other	

*** *PAUSE POINT, THEN* CONCLUSION/ FOLLOW-UP PLAN ***

TO-DO/ FOLLOW-UP	NOTES
1.	
2.	
3.	
4.	
5.	
6.	

Available "kit" (supplies, equipment, medications) !! PHOTOGRAPH AND SEND VIA EMAIL BEFORE CALLING !!
(circle all on hand/ available)

IV access: IV Central line IO (location)
Monitoring: ProPackTempus Foley Graduated urinal
IV Fluids: LR Plasma Lyte Normal Saline 3% saline
Colloids: Hetastarch Albumin
Blood products: whole blood PRBC plasma FDP Platelets
Medications: Antibiotics: name/ route/ dose _____
Morphine IV/ PO Other opioid (name/ IV/ PO): _____
Fentanyl IV/ PO (pop) Ketamine
Midazolam Diazepam (IV/ PO)
TXA Other: _____
Airway supplies: ETT Cric kit Ventilator O2 Suction
Misc:

Tele-consultation Card

ADMINISTRATION OF BLOOD AND BLOOD COMPONENTS PROTOCOL

SPECIAL CONSIDERATIONS:

1.

Blood and blood components should only be administered by personnel who are trained in the proper procedure and the identification and management of transfusion reactions. As little as 30ml of incompatible blood or red blood cells (RBCs) can cause a fatal hemolytic reaction.
2.

Whole blood must be ABO compatible.
3.

You must have a plan if you intend to use whole blood. You may use an strategy of type A for type A and type O low titer in order to maximize the donor pool or type O low titer as a "universal donor".[47] You may use type specific if you are absolutely certain of the blood types.[37] *In extremis*, type O, non-titered whole blood may be used. The consequences of infusing a unit of possibly high titer fresh whole blood far outweigh the risk of patient death if a transfusion is not performed. .[35, 36, 46]
4.

Once you begin transfusion type O blood, if the patients' blood type is not type O you may not switch to any other type. Doing so can cause a fatal hemolytic reaction.
5.

Use only collection bags designed for the collection of whole blood (WB) and administration sets designed for the administration of blood and blood components. Failure to do so may lead to fatal thromboembolic events.
6.

The only solutions approved by the FDA and AABB for use with blood and blood components are normal saline (NS) and Plasma-Lyte A pH 7.4. Although Lactated Ringer's (LR) and other solutions have been shown to be compatible under certain circumstances, they are not approved for use by the FDA or AABB.[1-4]
7.

Any time an incompatible solution has been administered use a new catheter and administration set or flush the catheter and administration set with 50ml of NS before administering blood.
8.

Sterile technique must be followed when performing transfusions in the field to prevent subsequent infection.

INDICATIONS:

If the patient is in shock, especially in the presence of known or suspected non-compressible hemorrhage, then resuscitate IAW the most current CoTCCC guidelines.

OVERVIEW:

1. Whole blood (WB) is blood that has not been modified except for the addition of an anticoagulant. WB provides the equivalent of Fresh Frozen Plasma (FFP), RBCs and Platelets (PLTSs) in a 1:1:1 ratio. FWB will have a shelf-life of 24 hours and should be transfused immediately or stored at 33-43 °F (1-6 °C) within 8 hours after collection, unless otherwise directed by medical staff due to insufficient or no red blood cell (RBC) or plasma product inventory. It should be tested with rapid test kits to decrease the risk of infectious disease transmission. Identify a blood donor who is ABO identical with the intended recipient.
2. WB is sometimes referred to fresh whole blood (FWB) if it has been recently collected. However, there is no time standard as to when it is no longer considered to be fresh. It is also referred to as

warm fresh whole blood (WFWB) when it is still warm following collection. WB is separated into different components.

Any separated component, including RBCs or Packed RBCs (PRBCs), is considered a blood component and therefore **CANNOT** be correctly referred to as blood. Blood refers to WFWB, FWB, and WB.

3. The following are in use by SOF medics.
   a. Fresh frozen plasma (FFP)
   b. Packed red blood cells (PRBCs)
   c. Warm fresh whole blood (WFWB)
   d. Fresh whole blood (FWB)
   e. Whole blood (WB)
   f. Freeze Dried Plasma (FDP)*

*FDP is being used under an investigational new drug (IND) protocol within USSOCOM. This is the ONLY authorized manner by which FDP can be administered in a role I setting.

4. Prior to initiation of transfusion, the following will be checked:
   a. Vital signs (T, P, R, BP). Measure, evaluate and record baseline vital signs. Every effort should be made to monitor temperature as an increase in temperature may be the first indicator of a transfusion reaction.
   b. Casualty blood type should be confirmed.
      i. In an emergency, establish ABO/Rh of recipients and donors via local testing or previous testing.
      ii. EldonCard® tests should ONLY be used to confirm previous results obtained using the ABO/Rh test tube method.

Although identification tags for ABO/Rh verification is authorized it should be utilized as a last resort only.[26] Accurate identification and verification of the donor's blood and the intended recipient may be the single most important step in ensuring transfusion safety.

   c. Active warming loss prevention should be used to prevent casualty hypothermia.

TRANSFUSIONS:

1. Ideally blood products should be warmed to approximately 98.6 °F (37 °C) prior to transfusion. Do not exceed 102 °F (39 °C) as this may cause an inflammatory reaction and lyse some of the red cells.

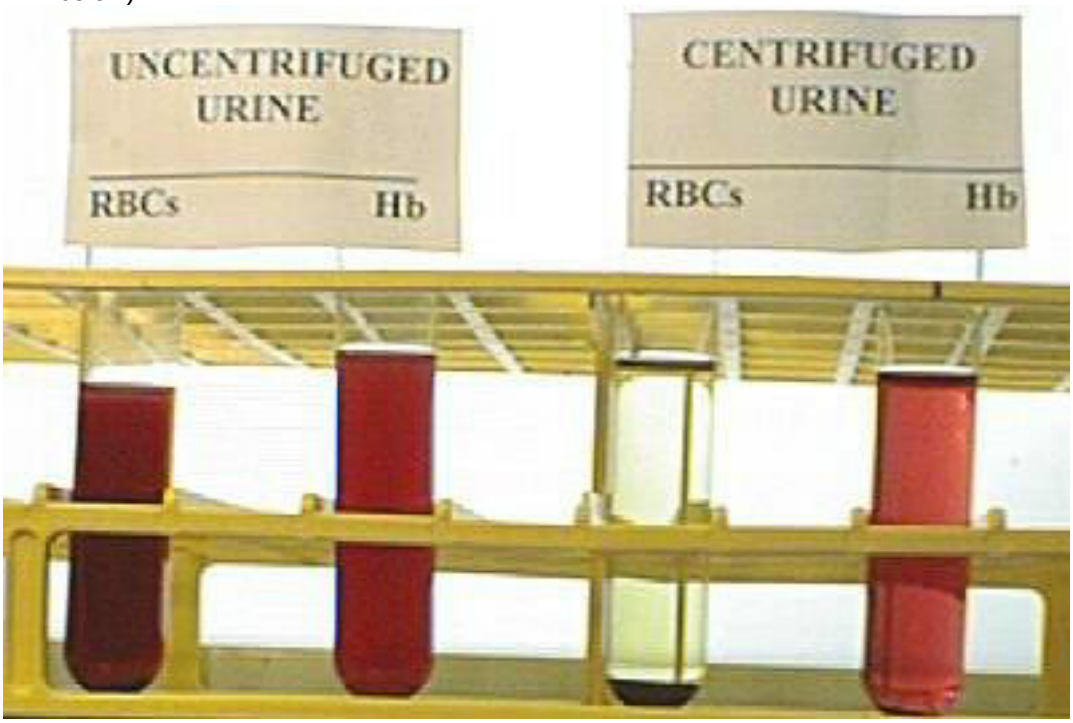
Do not use warmers directly against the fluid bag because of the risk of hemolysis or damage to the blood or blood product. Blood or blood components should not be warmed in a microwave, unless it is specifically designed for that purpose.

2. Blood and blood components may be pressure infused using a pressure infuser that encases the entire blood collection bag. Do not use a BP cuff for pressure infusion as they deliver uneven pressure.

Do not exceed 300mmHg with the pressure infusion device.

3. The largest bore IV catheter should be used. An IO device may be used. Ensure that a strong flush is done and good flow is obtained prior to using an IO infusion.
4. When performing any administration of blood or blood components the patient should be continuously monitored for signs and symptoms of an immunologic blood transfusion reaction. The first 10-15 minutes of any transfusion are the most critical.
   a. **Anaphylactic Reaction**
      i. Shock
      ii. Hypotension
      iii. Angioedema
      iv. Respiratory distress
   b. **Acute Hemolytic Transfusion Reaction** Acute Hemolytic Reaction usually has onset within 1 hour
      i. Evidence of disseminated intravascular coagulopathy (DIC) - oozing from blood draw, IV sites.
      ii. Flushing, especially in the face

iii. Fever and increase in core temp of more than 2 °F (1 °C)
iv. Shaking, chills (rigor)
v. Flank pain or the acute onset of pain in the chest (retrosternal), abdomen and thighs
vi. Wheezing, dyspnea
vii. Anxiety, feeling of impending doom
viii. Nausea and vomiting
ix. Hypotension
x. Pain, inflammation, and/or warmth at the infusion site
xi. Red or Brown Urine (hemoglobinuria)-The onset of red urine during or shortly after a blood transfusion may represent hematuria (indicating bleeding in the lower urinary tract (tube #1 below) or hemoglobinuria (indicating an acute hemolytic reaction, tube #2 below). If freshly collected urine from a patient with hematuria is centrifuged, red blood cells settle at the bottom of the tube, leaving clear yellow urine supernatant (see tube #3 below). If the red color is due to hemoglobinuria, the urine sample remains red after centrifugation (see tube #4 below).



Tube: 1 2 3 4

Uncentrifuged and Centrifuged Urine Samples

(Retrieved from http://img.medscape.com/pi/emed/ckb/hematology/197800-206885-156.jpg)

xii. Alternatively, urine tests strips can reveal the presence of blood in the urine. This may represent hemoglobinuria (indicating an acute hemolytic reaction) or hematuria (indicating bleeding in the lower urinary tract).
xiii. Plasma in a sample of centrifuged anticoagulated venous blood is normally clear (tube #1 below), but will be pink-red if significant intravascular hemolysis (e.g., hemoglobinemia) has occurred within the previous few hours (tubes 2-4 below).

Tube: 1 2 3 4

Centrifuged Blood Samples Showing Clear Plasma and Worsening Levels of Hemolysis
(Retrieved from http://pediatrics.med.unc.edu/education/uncpeds/conferences/uploads/Ped Transfusion Med Noon Conference.pptx)

c. **Febrile Non Hemolytic Reactions**
   i. Fever not as severe as with an acute hemolytic reaction
   ii. Chills
   iii. Dyspnea
d. **Urticarial Reactions - Urticaria**
e. **Other transfusion related signs and symptoms**
   i. Flushing (especially in the face), urticaria, or edema
   ii. Increased pulse or respiratory rate
   iii. Nausea, vomiting or diarrhea\
   iv. Pain and/or edema at the infusion site
   v. Headache
   vi. Feeling of impending doom
f. **Citrate Toxicity**
   i. Mild
      1). Perioral and periorbital paresthesia
      2). Metallic taste in the mouth
      3). “Tingling” sensation around the mouth or in the extremities
   ii. Severe
      1). Carpopedal spasms
      2). Twitching
      3). Chills
      4). Stomach cramps
      5). Pressure in the chest
      6). Hypotension and possible cardiac arrhythmia
      7). Nausea and/or vomiting
      8). Tetany
      9). Laryngeal spasm
      10). Seizures
      11). Bradycardia
   iii. Treatment

1). **Mild Toxicity -** Slow or stop transfusion until symptoms subside. Ensure proper mixture and concentration of citrate

2). **Severe Toxicity**

a). Give 0.45 mEq elemental calcium or approximately 1mL of a 10% calcium gluconate (100mg/mL) for each 100mL citrated blood infused. Infuse over 10-20min for each 1 to 2 gm of calcium gluconate. Diluted prior to administration (D5W or NS 100-250mL).

Note: 10% calcium gluconate solution (100mg/mL): 1mL = 0.46 mEq elemental Ca = 9mg elemental Ca

b). Can be repeated every 4-6hrs depending on symptoms.

Use a 0.22 micron filter for administration.

Do not rapidly infuse Calcium nor give more than one dose without the ability to monitor electrolytes. This may lead to cardiac arrhythmias and could cause necrosis of the vein.

5. Treatment of Immunologic Blood Transfusions Reactions.

The first step in treating ALL transfusion related issues is to STOP the transfusion and save all of the blood products and equipment used for administration and typing for follow-up testing.

a. **Anaphylactic Reactions**

i.
Epinephrine 0.5mL of 1:1000 IM

ii. Airway maintenance and oxygenation

iii. Resuscitate hypotensive patients with IV fluids.

b. **Acute Hemolytic Transfusion Reaction (AHTR)**

i. Immediately STOP the transfusion

ii. Initial Treatment

1). Secure and maintain airway

2). Begin an IV infusion of Lactated Ringer's (LR).

DO NOT run any fluid through the line that was carrying blood.

3). The goal of fluid resuscitation is to maintain a urine output of 100-200mL/hr until the urine is clear of hemolyzed RBCs.

4).
Administer mannitol 20% (Osmitrol®) 20gm IV over 5 minutes using a 0.22 micron filter to prevent infusion of mannitol crystals. If diuresis does not occur, repeat the 20gm dose once. The patient should receive a Foley catheter to monitor urine output.

If crystals are observed, the container should be warmed by appropriate means to not greater than 60 °C, shaken, then cooled to body temperature before administering. If all crystals cannot be completely redissolved, the container must be rejected. Administer intravenously using sterile, filter-type administration set."

5).
If mannitol 20% (Osmitrol®) is unavailable or does not produce diuresis, administer furosemide (Lasix®) 40-80mg initially and titrate later doses to maintain urine output of 100-200mL/hr.

6). However, if urine output is not obtained within 2-3 hours of administration of fluid, consider the development of Acute Renal Failure and discontinue further fluids.

7).
Consider using acetaminophen (Tylenol®) 1gm PO, PR, or IV (every 6 hours to treat discomfort associated with fevers. (Avoid the use of aspirin or other NSAIDS).

8).
Administer 25-50mg of diphenhydramine (Benadryl®) IM, or IV to treat the associated histamine release from AHTR and help manage the chills and rigor.

Antihistamine (IV administration) must never be mixed with blood or blood products in the same transfusion lines.

iii. SAVE the rest of the donor blood and any typing information available and evacuate with the patient. This will allow for ABO and further diagnostic testing at the medical treatment facility.

c. **Febrile Non Hemolytic Reactions**

i. Treat with antipyretics. Acetaminophen (Tylenol®) 1gm PO, PR, or IV (avoid the use of aspirin and other NSAIDS). For ease of administration, consider the use of rapid release acetaminophen through a nasogastric (NG) tube. Rapid release acetaminophen can be dissolved in water within 5 minutes and then delivered through the NG tube.

Acetaminophen rapid release.
(Retrieved from http://www.drugs.com/imprints/l-5-10933.html)

ii. If symptoms abate and there is no evidence of an acute hemolytic reaction consider restarting the transfusion.

iii. Pretreatment with antipyretics and antihistamines is not recommended in this protocol. Although it is commonly done there is no evidence that is decreases the incidence of fever and urticaria associated with transfusions. It could also mask the symptoms of a hemolytic reaction.[28-35]

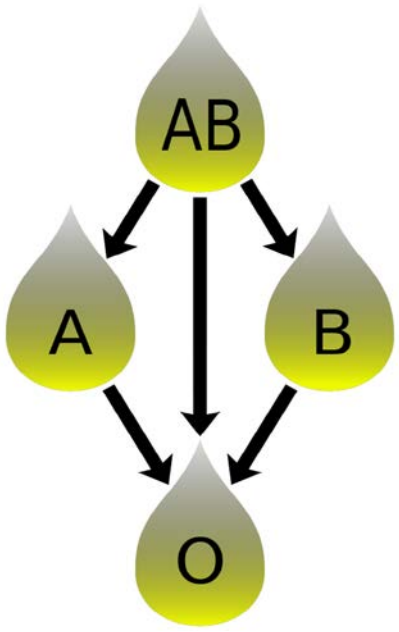
d. **Urticarial Reactions**

i. Treat with 25-50mg diphenhydramine (Benadryl®) IM or PO.

ii. If symptoms abate and there is no evidence of an acute hemolytic reaction consider restarting the transfusion.

ADMINISTER FFP:

1. Keep FFP frozen at -0.4 °F (-18 °C) or below.
2. Do not rough handle FFP before thawing because the bags can be easily cracked, broken, or damaged.
3. FFP should be thawed in a water bath with the FFP bag wrapped in a plastic overwrap bag to protect the ports from contamination and to lessen the risk of contaminating the water bath if the FFP bag is broken or cracked (See Enclosure #2: Suggested Packing List). Thaw FFP at 98.6 °F (37 °C) or by using a method and/or equipment that is intended (validated) for such use. Do not exceed 107 °F (42 °C).
4. Turn the plasma during the thawing process and ensure that all fibrin clots are dissolved.
5. The plasma should be administered as rapidly as possible after thawing. Keep plasma refrigerated at 33-43 °F (1-6 °C) prior to administration.
6. Thawed plasma can be stored for 3 days at 33-43 °F (1-6 °C) and then should be returned to the MTF for use. If thawed plasma cannot be returned to and MTF for use then it should be discarded after storage at 33-43 °F (1-6 °C) for 5 days. Thawed plasma can only be kept for 30 minutes at room temperature (68-75 °F (20-24 °C).
7. AB is the universal donor for plasma.
8. FFP is normally supplied as type AB or A.
9. Rh factor is not a concern when administering FFP.
10. Ensure compatibility of recipient.



Plasma Compatibility Diagram
(Retrieved from http://en.wikipedia.org/wiki/File:Plasma-donation.svg)

11. Administer 2 units of FFP and then begin administering PRBCs in a 1:1 ratio if available. You may bolus or pressure infuse FFP immediately.

PERFORM A WHOLE BLOOD (FWB) TRANSFUSION:

1. LOCATE A SUITABLE DONOR.
   a. Identify a blood donor who is ABO compatible with the intended recipient.
   b. Due to the prevalence of Type A blood follow the rule, "Type A to Type A and then Type O for everyone else".
   c. Rh+ (positive) patients may receive either Rh+ (positive) or Rh- (negative) blood.
   d. Rh- (negative) patients should receive Rh- (negative) blood if possible, but this may be disregarded *in extremis* unless the patient has received OR been exposed to Rh+ (positive) blood and "sensitized" to the Rh antigen.
   e. Rh- (negative) females with childbearing potential must be given priority for Rh- (negative) blood to avoid the risk of Rh sensitization.
   f. Low titer blood should be used first. There is no universally accepted titer level for a unit to be considered "low titer". There are two methods of determining titer levels; the indirect antiglobulin technique (IgG) and the saline technique (IgM). Based on safe historical use and other precedents, levels of IgG<400, and IgM<100 have been used successfully. [36] **USSOCOM recommends a titer level of <IgM256.**[46]
   g. "Type O" non-titered whole blood may be used *in extremis* circumstances. The consequences of infusing a unit of possibly high titer fresh whole blood far outweigh the risk of patient death if a transfusion is not performed. .[35, 36, 46]
   h. Donors should not be consangenous to the recipient (closely related family members) in order to lessen the possibility of graft versus host disease.[37]
   i. When appropriate, set up a “walking blood bank” with pre-screened donors prior to deployment.
   j. The single most important way of protecting the patient and donor is to conduct a thorough donor interview for infectious disease risk factors, determination and qualification of the heath of the donor on the day of donation (see Enclosure #1: Donor Questionnaire).
   k. Donor should preferably be U.S. military.
   l. The safest donor candidate is one with recent laboratory confirmation of blood group/type and no evidence of transfusion transmissible disease. Prior blood donors are preferred.
   m. Females who have been pregnant in the past, even if they did not reach full term should only be used as a last resort because of the increased risk of Transfusion Related Acute Lung Injury (TRALI) (1 in 10,000-60,000).

n. Personnel who have received blood transfusions in the past should only be used as a last resort because of the increased risk of a transfusion reaction.
o. It is highly recommended, to perform rapid, on-site viral marker screening tests of potential blood donors using screening immunoassays for infectious diseases (e.g., HIV, HBsAg, HCV) before blood is transfused. If testing is not possible prior to transfusion, rapid, on-site viral marker testing should be performed as soon as possible and the results recorded appropriately. NSNs for rapid viral marker screening assays are listed in suggested packing list (See Enclosure #2: Suggested Packing List).
p. Retrospective testing for infectious disease markers will be performed on all donor specimens. This testing will be completed at an FDA-approved, DoD laboratory IAW FDA/AABB standards.
q. The donor should report to the nearest MTF capable of performing blood sample collection and processing IAW the applicable theater.
r. Send donor pilot tubes to a supporting theater Blood Support Detachment for transport via established channels to an FDA-approved DoD reference testing laboratory. This should be done as soon as feasible.

s. GROUNDING procedure. Army Regulations (AR) and Air Force Instructions (AFI) both mandate that aircrew personnel not fly within 72 hours following blood donation. Office of the Chief of Naval Operations Instructions (OPNAVINST) prohibit aircrew personnel from being regular blood donors and mandates that aircrew personnel not participate in flight duties for 4 days following blood donation. OPNAVINST also mandates that flight personnel in combat or performing shipboard duties not donate blood for 4 weeks prior to flying and states that the flying unit commander must approve donations of blood, plasma or bone marrow by aircrew members. (AR 40-8 dtd 16 May 2007, AFI 11-202V3 dtd 10 August 2016, OPNAVINST 3710.7U dtd 23 November 2009). All other donors should be given light duty or quarters for at least 72 hours following donation.[38, 39]
t. Every effort should be made to send all blood collection and administration equipment as well as all blood typing tests and any viral tests performed along with the patient for retrospective testing and documentation.

2. Perform collection.
a. Clean donor's arm with povidone iodine or appropriate alternate antiseptic agent for at least one minute at least 3 inches in diameter from the anticipated site of the venipuncture.
b. Donor blood should be drawn from an arm vein into an in-date, intact commercial single unit whole blood collection bag. The bag is 600mL capacity and contains 63mL of CPD or CPDA-1 anticoagulant and is intended to collect 450mL of blood +/- 10%.

Do not overfill the bag as overfilling of the bag could lead to clotting.
c. Place a constricting band tightly around the donor's arm or alternatively a blood pressure cuff inflated to 80mmHg.
d. Place a hemostat or pinch the line approximately 6 inches from the needle prior to removing the needle cap.

Failure to clamp or pinch the line prior to removing the needle cap could allow air to enter the line and prevent proper negative pressure generation in the collection bag and could lead to incomplete filling of the bag and contamination.

Clamping - the line must be clamped or pinched approximately 6 inches from the needle to avoid air entering the line and preventing negative pressure formation from gravity pulling the liquid into the collection bag when the cap is removed.

WARNING Do not infuse blood from an incompletely filled collection bag faster than the time needed to infuse a completely filled collection bag, because this would result in an increased risk of citrate toxicity.

e. Perform venipuncture. Twist off the needle cover and inspect the needle for barbs or other defects. Pull the skin taut below the venipuncture site and insert the needle bevel up at an angle of 30-45 degrees. Pierce the skin with a smooth, quick thrust at the selected point of entry. When the bevel is completely under the skin, lower the angle of the needle to approximately 10 degrees or less and with a steady push, advance needle to penetrate the vein wall. Thread needle approximately ½ inch inside the vein to maintain a secure position and to lessen the chance of a clot forming. Consider performing the collection with the bevel of the needle down to prevent occlusion of the bevel opening by the vein wall, which can occur. This can be done by rotating the needle 180 degrees after inserting it bevel up. Alternatively, you can prop up the needle using a rolled up 2-inch by 2-inch gauze or other item placed under the needle hub to keep the needle raised to the proper angle.

WARNING You may see little or no “flash” of blood in the collection line until you remove the clamp or pinch in the line. You should feel a “pop” when the vein is entered. If there is no flash when the clamp or pinch is removed then the needle may be partially withdrawn and venipuncture reattempted. **Do not fully remove the needle from under the skin without a clamp or pinch in the line because this may allow air to enter the line. Air in the line can prevent negative pressure from forming when the line is opened and the column of fluid is pulled down by gravity and could lead to incomplete filling of the bag.**

f. Loosen the constricting band or deflate the blood pressure cuff to 40-60mmHg and maintain this pressure throughout the collection.

g. Place the collection bag below the donor’s heart and release the clamp or pinch in the line.

If the flow is sluggish, consider removing the constricting band or deflating the blood pressure cuff and reapplying or re-inflating respectively. This may be necessary to ensure good back pressure from venous return and will lessen the possibility of incomplete filling of the collection bag.

h. Tape the needle down at the hub and tape the line to the patient's skin to prevent it from being pulled out.

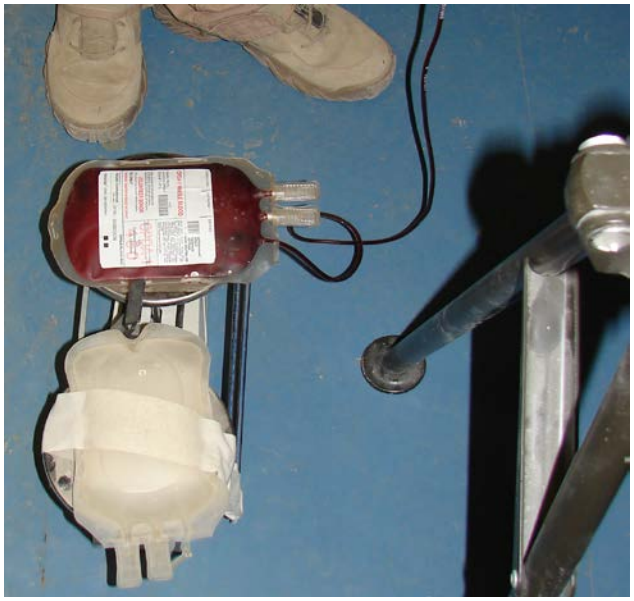
i. Begin rocking the bag as soon as blood flow begins and continue gently rocking the bag about every two minutes during collection to ensure thorough mixing of the citrate with the blood to prevent areas of high citrate concentration. Make every attempt to insulate the collection bag and keep it off of the ground in order to keep the collected blood warm.

j. Remove about 450mL of blood (enough so the bag is almost full). Overfilling the bag may cause clotting. A trip scale should be used for accuracy (measure 450 +/- 50gm plus weight of blood bag). Alternatively, a 9.5-inch piece of 550-cord (NSN 4020-00-246-0688) can be used to estimate when the blood collection bag is adequately filled. With the bag lying on a flat surface place the 9.5-inch piece of cord under the bag and wrap it around the width of the bag. When you are able to bring the ends of the cord together to the point where they will just barely meet without compressing or lifting the bag, the bag is adequately filled.

Never collect more than one unit from an individual.

Measurement - bring the ends of a 9.5-inch piece of cord together around the bag until they just meet.

k. If at a fixed facility a blood trip scale can be constructed with a counterweight of 585 grams. The counterweight can be approximated by adding 450mL of fluid to a blood collection bag and tying off the collection tubing.



Blood trip scale made from a balance beam scale with improvised counterweight
(Photo courtesy LTC Shawn C. Nessen, MD)

3. Once the bag is adequately filled, clamp the line with a hemostat near the collection bag and remove the needle. Then double knot the collection line between the hemostat and blood bag and cut between the knots.
4. If donor is expected to perform physical labor such as in a tactical situation. Have donor drink 500mL of Oral Rehydration Salts (ORS) mixed in a ratio of 1 packet in 1000mL of potable water.
5. Donor should lie down during collection because of the risk of syncope.
6. Donor should take food and drink immediately after donation.
7. Donor must wait at least 56 days between donations, unless the blood is reinfused into the donor in which case there is no time limit between donations.

   WARNING Make no attempt to bank blood. Collected blood should be transfused immediately, and must be used within 24 hours. Unused blood may be re-infused into the donor, but must be discarded after 24 hours. Do not attempt to re-infuse unused blood into the donor unless the collection bag has been completely filled or it may lead to citrate toxicity. **DO NOT RE-INFUSE BLOOD INTO THE DONOR IF YOU ARE IN DOUBT ABOUT THE IDENTITY OF THE DONOR. THE DONOR MUST SIGN THE BAG UPON COLLECTION AND YOU AND THE DONOR MUST CONFIRM THE SIGNATURE PRIOR TO RE-INFUSION. IF ANY DOUBT WHATSOEVER EXISTS, DISCARD THE COLLECTED BLOOD!**
8. In extremis you may transfuse an incoplementtely filled bag by one of two methods. Method #1 (preffered)-Fill the remainder of the collection bag with compatible fluid like Plasma-Lyte A pH 7.4 or Normal Saline until the collection bag is properly filled. Method #2-Infuse the bag slowly to avoid citrate toxicity.
9. If necessary, confirm blood types using the EldonCard® blood typing kit. Unless you have recent laboratory confirmation of blood group/type, confirmation using an EldonCard® is HIGHLY recommended.
   a. Once you have found a suitable donor and initiated a blood collection, confirm the donor and recipient blood types with an EldonCard® blood typing kit.
   b. Perform blood typing with an EldonCard® blood typing kit in accordance with the manufacturer's instructions.
10. If you are performing a WB transfusion and there is any doubt about the ABO typing, consider performing a whole blood cross-match test if possible.
    a. If you have access to a method of separating the plasma from a blood sample, you can attempt to perform a whole blood cross-match. This increases the safety of a WB transfusion.
    b. After separating, take four drops of the recipient's plasma and place them on a smooth white tile, glass slide or a clean smooth piece of glass.
    c. Take one drop of whole blood from the donor and add it to the recipient's plasma and gently mix using the tip of a needle or other sterile instrument.

d. If using a glass slide or piece of glass, place the mixture of plasma and whole blood against a bright white background.
e. Wait four minutes and observe the mixture for signs of agglutination. The test should be performed no colder than room temperature 68 °F (18 °C) and optimally at 98.6 °F (37 °C). Stirring the mixture should help determine if there is any agglutination. A magnifying lens and bright light can aid in determining if there is agglutination present.

Agglutination

(Retrieved from http://www.vetmed.wsu.edu/courses_vm551_crd/images/agglutination.JPG)

If any sign of agglutination is present then the transfusion should not be performed.

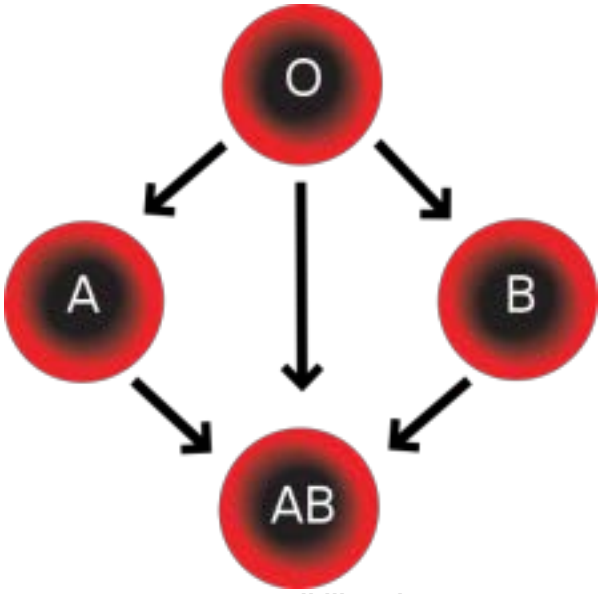
CANINE CONSIDERATIONS

1. Canines have naturally occurring antibodies to the antigens that are found on their RBCs. These naturally occurring antibodies can cause IHTR the first time a FWB transfusion is performed.[46]
2. Canines have an entirely different set of blood type antigens and cannot be typed using human blood typing supplies, but the aforementioned whole blood crossmatch procedure can be performed in the same manner. Optimally canines should be typed and crossmatched prior to transfusion. However, due to the lower incidence of IHTR and for expediency the normal standard of care is to allow them to receive a blood transfusion from any potential donor provided neither the donor nor the recipient has ever received a blood transfusion.
3. Normally the same amount of blood is collected from a canine donor for transfusion (450mL). The donor must weigh 50lbs or more or the collection should not be conducted. A regular collection bag containing 63mL of CPD or CPDA-1 is used.
4. Human blood products cannot be used in canines.

ADMINISTER BLOOD (WB, FWB, WFWB) OR PRBCs:

1. Store WB and PRBCs at 34-43 °F (1-6 °C). WB should only be stored at these temperatures if is not going to be transfused immediately, but never longer than 24 hours. Refrigeration of WB has shown to decrease platelet function.
2. Ensure compatibility of recipient.
3. When administering PRBCs, the first choice is ABO type specific (identical) and Rh compatible. If this is not available, use O type blood.

Type O blood is the "universal donor" for PRBCs.



PRBC Compatibility Diagram
(Retrieved from http://en.wikipedia.org/wiki/File:Blood_Compatibility.svg)

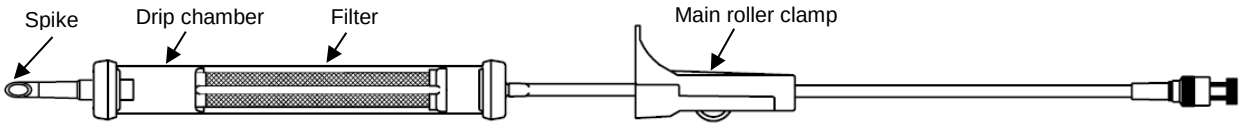
a. In a patient with a history of allergies or an allergic transfusion reaction, give diphenhydramine (Benadryl®) 25-50mg IV (through a separate line), IM, or PO prophylactically just before or at the beginning of the transfusion.

WARNING Antihistamine must never be mixed with blood or blood products.

b. In a patient with a history of a febrile reaction Acetaminophen (Tylenol®) 1gm PO, PR, or IV may be given prophylactically before the transfusion.

c. Prepare the blood or PRBCs and the blood administration set.

WARNING Always use an administration set specifically designed for the administration of blood and blood components. The administration set should filter between 170-260 microns. There is no set number of units that can be delivered before an administration set must be switched out. An administration set should be changed when it becomes clogged or after 24 hours. The number of units that an administration set can deliver before becoming clogged depends on the level of filtration and the amount of microagglutins that have formed. The older the blood or PRBCs the higher the amount of microagglutins there will be. A 170 micron set can reliably deliver 3-4 units of blood or PRBCs before the filter becomes clogged and must be changed. A 260 micron set can reliably deliver about 6-8 units of blood or PRBCs before it becomes clogged and must be replaced.



Filtered Blood/Solution Set

i. Close clamp on the tubing.
ii. Aseptically uncap and insert the spike into the blood or PRBC port and hang the blood or PRBCs at the same level as the NS container.
iii. There is no need to prime the administration set with NS.

d. Connect the blood line.
i. Patients receiving blood or blood components must have two IV sites in the event of complications or emergencies.
ii. Establish one or two new IV sites as needed.

iii. Use a large gauge IV catheter (14, 16, or 18) to enhance the flow of blood or PRBCs and prevent hemolysis of the cells.
iv. If the patient already has two IV sites, aseptically switch one of the existing IV lines with the filtered blood line or piggyback the filtered blood line into an existing IV line.

e. Begin the infusion of blood or PRBCs.
i. Attach the primed infusion set to the catheter, tape it securely, and open the main roller clamp.
ii. Close the roller clamp to the NS, and open the roller clamp to the blood or PRBCs.

Ensure you that you close the roller clamp to the NS prior to opening the roller clamp to the blood or PRBCs or the blood or PRBCs will flow into the NS. If the blood or PRBCs become mixed with the NS, shut off the roller clamp to the NS and deliver the blood or PRBCs.

iii. The viscosity of PRBCs (especially if they are cold and using an in-line blood warmer) may cause difficulty in delivery through long tubing sets and filters. Using 300mL of NS to back fill the PRBCs will improve delivery. Whole Blood usually does not require dilution for effective delivery.
iv. Adjust the flow rate with the main roller clamp.
v. Set the flow rate to deliver approximately 10-30mL of blood or PRBCs over the first 15 minutes.
vi. Monitor the vital signs every 5 minutes for the first 15 minutes and observe the casualty for indications of an adverse reaction to the blood or PRBCs.

Anytime an adverse reaction is suspected, immediately stop the blood or PRBCs and infuse NS through a completely separate catheter and IV line.

vii. If after the first 15 minutes no adverse reaction is suspected and the vital signs are stable, open the main roller clamp or set at the desired flow rate. You may bolus or pressure infuse the blood or PRBCs at this time.

f. Monitor and evaluate the patient throughout the procedure.
i. Monitor vital signs every 15 minutes.
ii. Compare the vital signs with previous and baseline vital signs.
iii. Observe the casualty for changes that indicate an adverse reaction to the blood or PRBCs.
iv. If a reaction is suspected, stop the blood or PRBCs, infuse LR through a separate IV line, and identify and treat the reaction.

When a transfusion reaction occurs or is suspected, no more fluid should be infused through the IV line or catheter. The unused blood or PRBCs and recipient tubing should be sent along with the patient for testing.

2. Discontinue the infusion of blood or PRBCs when the patient's vital signs have stabilized or the transfusion is finished.
a. Close the clamp to the blood or PRBCs and open the clamp to the NS.
b. Flush the tubing and filter with approximately 50mL of NS to deliver the residual blood or PRBCs.
c. After the residual blood or PRBCs have been delivered, run the NS at a TKO rate or hang another solution, as needed.
d. Take and record the vital signs at the completion of the transfusion and continue to monitor until evacuation.
3. Document the procedure. Ensure you document the infusion of any blood or blood component, to include the number, component type, and blood type of units infused on the casualty card (DA FORM 7656) and send this with the patient to the MTF.

DISPOSITION:
Urgent evacuation is indicated for any casualty requiring the administration of blood or blood components.
Urgent evacuation is indicated in any patient who has an acute hemolytic reaction while undergoing a blood transfusion.

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Enclosure #1-QUESTIONNAIRE

EMERGENCY WHOLE BLOOD DONATION RECORD

(Modified Version of the DD Form 572)

Blood Unit Number

Use Donor SSN if ISBT # Not Available

MTF/Location: _____ Donation Date: _____

Donor's Full Name: _____ Rank: _____ Branch: USA USAF USN USMC CIV

SSN: _____ Date of Birth: _____ Sex: M / F Ht/Wt: _____ (> 110 lbs) ABO/Rh (Blood Type) :_____

Deployed Unit/Location: _____ Local DSN Phone: _____ Redeployment Date: _____

Current Residence: Bldg/Tent # _____ RM # _____

Home Address (Stateside) _____

Home Phone Number: (____) _____ Email: _____

Y 21. N	Female Donors: Are you pregnant now, or have you been Pregnant in the last 6 weeks?	Y 36. N	Have you ever had Chagas' disease, babesiosis, or Leishmaniasis?
Y 22. N	Are you feeling well and healthy today?	Y 37. N	In the past 12 months, have you been given a rabies shot?
Y 23. N	Have you read and do you understand all the donor information presented to you, and have all your questions been answered?	Y 38. N	In the past 12 months, have you had an accidental needle stick or come in contact with someone else's blood?
Y 24. N	Do you understand that if you are in a high risk group, you may have the AIDS virus and you can give it to someone else even though you may feel well and have a negative AIDS test?	Y 39. N	In the past 12 months, have you had a tattoo, ear or skin piercing, or acupuncture?
Y 25. N	Have you ever given blood under another name or Social Security Number?	Y 40. N	In the past 12 months, have you had close contact with a person with yellow jaundice or hepatitis or been given Hepatitis B Immune Globulin (HBIG)?
Y 26. N	In the past 8 weeks have you given blood, plasma or platelets?	Y 41. N	Have you ever had yellow jaundice, liver disease, hepatitis, or a positive test for hepatitis?
Y 27. N	Have you ever been refused as a blood donor or told not to donate blood?	Y 42. N	In the past 4 weeks, have you had any shots or vaccinations?
Y 28. N	In the past 12 months have you been under a doctor's care, had an illness, or surgery?	Y 43. N	In the past 8 weeks, have you received a smallpox vaccination or had close contact with the vaccination site of anyone else?
Y 29. N	In the past 12 months, have you received blood, blood products, or a tissue transplant including any you may have donated for yourself (autologous)?	Y 44. N	In the past month, have you taken Finasteride (Proscar, Propecia) or Isotretinoin (Accutane, Amnesteem, Claravis, Sotret) or in the past 6 months, have you taken Dutasteride (Avodart)
Y 30. N	In the past 3 years, have you had malaria?		
Y 31. N	In the past month, have you taken any pills or medications?		
Y 32. N	Have you ever been given growth hormone or received a dura mater (or brain covering) graft?		
Y 33. N	Have you ever taken Etretinate (Tegison) or Acitretin (Soriatane)?		
Y 34. N	Have you ever had cancer, a blood disease, or a bleeding problem?		
Y 35. N	Have you ever had chest pain, heart disease, or lung disease?		

(Use this section and reverse side of form to explain "Yes" answers above. With the exception of questions 22-24)

High Risk Oral Questions (30May2003) Asked By: _____ Donor: Temp: ____°F/°C (< 99.6°F/37.5°C) BP: ____/____ (≤ 180/100) Pulse: _____ (< 100 bpm) HCT/Hgb: _____ (> 38% or 12.5 g/dL)

31. Medications: _____

Malaria Prophylaxis: Daily_____(Doxycycline) Weekly_____(Mefloquin) N/A _____

Your blood will **NOT** be tested for viral diseases prior to transfusion due to the emergency, if you any reason you feel your blood may not be safe or you could answer yes to the high risk questions, please do not donate today. I have read/ had explained to me the high risk questions and am not in a high risk category, and feel my blood is safe to donate at this time.

I verify that I have answered the questions honestly, and feel my blood is safe to be transfused. _____

Donor's Signature

Phlebotomist:_____ Start Time:_____ Stop Time:_____ (Should be < 15 minutes)

Bag Manufacturer _____ Lot #:_____ Expiration date: _____ Segment Number: _____

The Modified DD Form 572 has been reviewed for completeness. If there are any risk factors that place the recipient at harm notify the ordering physician immediately for appropriate follow-up.

DD 572 (WB)
Version: 13 August 2009

SECTION 1

DIRECT ORAL QUESTIONS

PREAMABLE

I am required to ask you some questions. If you do not understand a question, please ask me to explain it before answering. The reason for asking these questions is to determine your suitability as a volunteer blood donor. Your answers to these questions will be kept strictly confidential, but may result in you being asked not to donate blood, either temporarily or permanently. Do not respond until I have asked you the entire group of questions, which at that time only give me one answer – Yes or No.

GROUP A:

1. Do you have AIDS or have you ever had a positive test for the AIDS virus (HIV)?
2. Have you ever taken illegal drugs with a needle, even one time (including steroids)?
3. Have you ever taken clotting factor concentrates for a bleeding disorder such as hemophilia?
4. At any time since 1977, have you taken money or drugs in exchange for sex?
5. ***Male donors only***: Have you had sex with another male, even one time since 1977?

(A "Yes" answer to Group A is a PERMANENT DEFERRAL)

GROUP B:

1. Were you born in, have you lived in, or traveled to any African country since 1977?

IF Response is	THEN
No	Proceed to Group B, Question 3
YES	Was it any of these countries: Cameroon, Benin, Central African Republic, Chad, Congo, Equatorial Guinea, Kenya, Gabon, Niger, Nigeria, Senegal, Togo or Zambia?
If No	Go to Group B, Question 3
If Yes – Travel Only	Proceed to Group B Question 2
If Yes – Born or Lived in	**Document when, DEFER INDEFINITELY**

2. When you traveled to (name of country) did you receive a blood transfusion, or any other medical treatment with a product made from blood?

IF Response is	THEN
No	Proceed to Group B, Question 3
YES	**DEFER INDEFINITELY**

3. Have you had sex with anyone who was born in, or has lived in any African Country since 1977?

IF Response is	THEN
No	Proceed to Group C
YES	Was it any of these countries: Cameroon, Benin, Central African Republic, Chad, Congo, Equatorial Guinea, Kenya, Gabon, Niger, Nigeria, Senegal, Togo or Zambia?
If NO to listed Countries	Proceed to Group C
YES to listed Countries	**Document when, DEFER INDEFINITELY**

(A "Yes" answer to Group B may be an Indefinite Deferral)

GROUP C:

1. Have you had sex in the last 12 months, even once, with anyone who has AIDS or has had a positive test for the AIDS virus?
2. Have you had sex in the last 12 months, even once, with anyone who has ever taken illegal drugs with a needle (including steroids)?
3. Have you had sex in the last 12 months, even once, with anyone who has taken clotting factor concentrates for a bleeding disorder such as hemophilia?
4. At any time in the last 12 months have you given money or drugs to someone to have sex with you?
5. At any time in the last 12 months, have you had sex with someone who has taken money or drugs in exchange for sex?
6. In the past 12 months, have you had a positive test for syphilis?
7. In the last 12 months have you had syphilis or gonorrhea or have you been treated for syphilis or gonorrhea?
8. In the last 12 months, have you received blood or blood products?
9. In the last 12 months, have you been incarcerated in a correctional institution (including jail or prison) for more than 72 consecutive hours?
10. In the last 12 months, have you taken (snorted) cocaine through your nose?
11. ***Female donors only***: In the past 12 months, have you had sex with a man who had sex with another man, even one time sine 1977?

(A "Yes" answer to Group C is a TEMPORARY DEFERRAL for 12 months following the event)

GROUP D:

1. Have you at any time since 1980 injected Bovine (Beef) Insulin?

(A "Yes" answer to Group D is an INDEFINITE DEFERRAL)

Direct Oral Questions January 10, 2010
Army Blood Program Policy Letter 2010-01-02

SECTION 1

Enclosure #2- FIELD EMERGENCY DONOR PANEL QUESTIONNAIRE AND TRIAGE TOOL

Field Emergency Donor Panel Questionnaire and Triage Tool

- **Give blood donor briefing to potential donor group**
- **Confirm blood group(s) required**
- **Exclude air crew, HGV drivers and key machinery operators**

Primary Triage (Question as a group)

Serial	Question	Yes	No	Action
1	**Do you want to give blood?**			Disqualify if NO
2	**Have you given blood before**			If yes - Consider early selection

Secondary Triage (Question individually)

Serial	Question	Yes	No	Action
3	**Are you unwell now?** New Fever/ Diarrhea / Vomiting Chronic medical condition and not well			Disqualify if YES
4	**Are you taking medication for blood pressure; stroke or heart, lung, kidney, cancer or blood conditions?**			Disqualify if YES
5	**Have you had a blood transfusion or blood products in the last year**			Disqualify if YES Accept after 1 year
6	**Are you living with HEP B,C / HIV / AIDS – OR living with anyone with these conditions**			Disqualify if YES
7	**Have you ever been refused as a donor or told not to donate blood** (a past history of treated anemia may be acceptable)			Disqualify if YES
8	**Male donors only.** Have you **ever** had sex with another male?			Disqualify if YES
9	**Have you ever taken illegal drugs with a needle (even steroids)**			Disqualify if YES
11	**Are you currently pregnant or breast-feeding?**			Disqualify if YES
12	**Conduct a physical examination Check: Temperature / Rash / Malnutrition, / Pallor / Jaundice / Cyanosis / Shortness of breath / Intoxication from alcohol or drugs / Veins**			Disqualify any potentially unwell donor or donors with very difficult veins

- **The remaining group form the Emergency Donor Panel (EDP)**
- **Use the Risk Triage Screen to risk score the potential donors**

Enclosure #2- FIELD EMERGENCY DONOR PANEL QUESTIONNAIRE AND TRIAGE TOOL (Continued)

Risk Triage (Question Individually)

Score	Questions	Subtotal	Notes
	Blood donation history		
1	Regular Donor		Optimum
2	Previous Donor		
3	Non Donor		
	Veins and body weight		
1	Good lateral (outer) vein		Optimum
3	Poor or difficult vein		
3	Under 60 kg		Risk of fainting
	Infection		
1	> 21 Days Well		Optimum
3	< 21 Days Well		
	Travel		
1	No travel in the countries below in the last 6 months		Optimum
2	South America		
4	Asia and Africa		
	Life style:		
1	Sex with one partner		Optimum
3	Sex with multiple partners but protected		
-	Sex with a sex worker or in exchange for money/drugs		Avoid for 12 months
	Serious medical conditions		
1	None		Optimum
3	Past or present serious medical conditions but managed and well		
3	Untreated current medical conditions but well		
	TOTAL		

- **Add up score and record: Lowest score = Lowest Risk**
- **Use Point of Care Test for TTI's – Eliminate and counsel any positives**
- **Blood type donors and document results**

Enclosure #3-SUGGESTED PACKING LIST

SUGGESTED MINIMUM EQUIPMENT FOR BLOOD COLLECTION AND ADMINISTRATION

Item Description	National Stock Number (NSN)
BLOOD COLLECTING AND DISPENSING BAG, CPD	6515-01-523-5964

NITRILE GLOVES, OD

Medium: 6515-01-521-7501

Large: 6515-01-521-7505

X-Large: 6515-01-521-7508

PAD, ISOPROPYL ALCOHOL IMPREGNATED 6510-00-786-3736

PAD,POVIDONE-IODINE IMPREGNATED 6510-01-010-0307

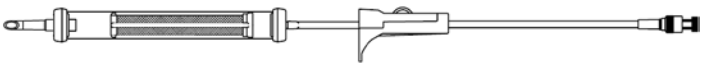
TOURNIQUET, NONPNEUMATIC (CONSTRICTING BAND) 6515-01-146-7794

SPONGE SURGICAL, STERILE, 2X2 INCH 6510-01-530-9413

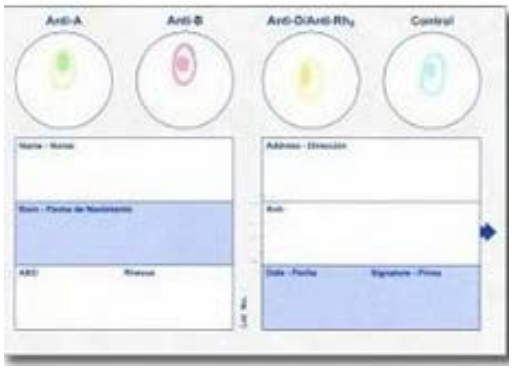
ADHESIVE TAPE, SURGICAL 6510-01-497-5161

NYLON CORD PIA-C-5040/MIL-C-5040, TYPE III, 9.5 INCH 4020-00-246-0688

BLOOD RECIPIENT SET, INDIRECT TRANSFUSION 6515-00-457-8131



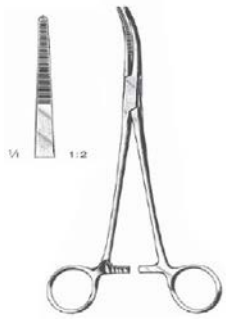
BLOOD TYPING CARD (ELDONCARD®) 6550-01-511-9294



SECTION 1

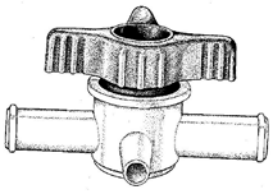
ADDITIONAL EQUIPMENT FOR COLLECTION AND ADMINISTRATION OF BLOOD AND BLOOD COMPONENTS

Item Description	National Stock Number (NSN)
FORCEPS, HEMOSTATIC	6515-01-459-3970



UNDERPAD, BLUE (CHUX)	6530-01-027-0179

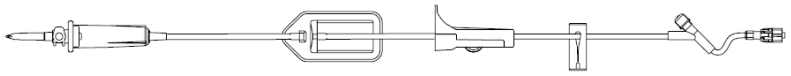
STOPCOCK, IV THERAPY, 3 WAY	6515-00-864-8864



CALCIUM GLUCONATE INJECTION	6505-00-097-8138

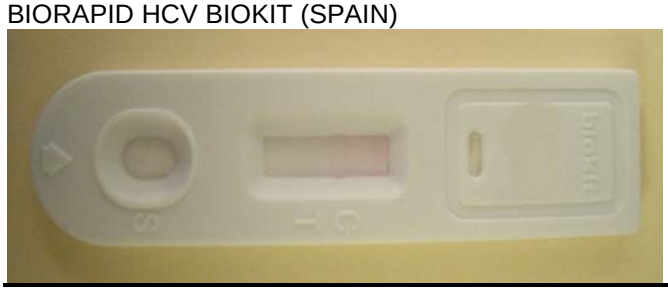
MANNITOL INJECTION	6505-01-125-3253

INTRAVENOUS INJECTION SET, FILTERED, 0.22 micron 6515-99-001-9683



BIORAPID HBSAG BIOKIT (SPAIN) 6550-08-133-2246

BIORAPID HCV BIOKIT (SPAIN) 6550-08-133-2247



HIV 1/2 RA ORAQUICK 6550-01-526-7424

ORAQUIK HCV 6550-01-589-9845

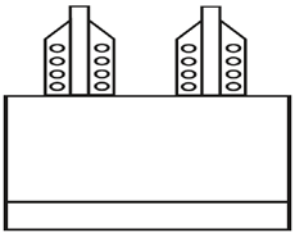
ONSITE (CTK) HBSAG (HEP B) 6550-01-472-6534

MALARIA RAPID DIAGNOSTIC DEVICE (MRDD) 6550-01-554-8536

B TEST KIT, SYPHILIS DETECTION 6550-01-511-0291

PLASMA OVERWRAP BAGS 6515-01-511-3624

THAWING SYSTEM, PLASMA (4 UNIT) 6640-01-510-3136



"Golden Minute Container"
CONTAINER, THERMAL, BLOOD TRANSPORT 6530-01-654-0062

GOLDEN HOUR CONTAINER

Woodland Marine Pixel	6530-01-505-5308
Desert Pattern	6530-01-505-5306
Woodland Army	6530-01-505-5301
Thermal Chamber, Replacement Part	6530-01-505-5311

BLOOD PRODUCT REFRIGERATOR/FREEZER 4110-01-506-0895

SECTION 1

CRUSH SYNDROME PROTOCOL

SPECIAL CONSIDERATIONS:

1. Be aware of development of crush syndrome starting as early as 4 hours post injury.
2. There is a theoretical benefit from using non-potassium containing fluids due to the increased risk of hyperkalemia, but the important goal is to establish adequate renal output regardless of which fluid is available.
3. These medications are not part of the standard SO-ATP aid bag and require development of a separate crush injury kit.

The principles of hypotensive resuscitation according to TCCC DO NOT apply in the setting of extremity crush injury requiring extrication.

In the setting of a crush injury associated with non-compressible (thoracic, abdominal, pelvic) hemorrhage, aggressive fluid resuscitation may result in increased hemorrhage.

With extremity injuries, tourniquets should NOT be applied during Phase 1 unless there is hemorrhage that is not controllable by other means.

Be aware of development of cardiac dysrhythmias due to hyperkalemia immediately following extrication.

DEFINITION:

Massive, prolonged crush injury resulting in profound muscle and soft tissue damage places the patient at significantly increased risk for developing circulatory and renal complications.

SECTION 1

MANAGEMENT:

PHASE 1: IMMEDIATE (while attempting extrication):

1. Maintain patent airway (NPA, OPA, etc.) and adequate ventilation.
2. Monitor O_2 sat with pulse ox and administer high flow oxygen if available.
3. Give initial bolus of 1-1.5L of any available crystalloid **PRIOR** to attempts at extrication and continue at 1.5L/hr.
4. Maintain urine output at greater than or equal to 200mL/hr. If possible, insert Foley catheter.
5. Assess and reassess mental status.
6. Follow ***Pain Management Protocol (TMEP)***
7. Consider prophylactic antibiotics - ertapenem (Invanz®) 1gm IV.
8. Utilize Propaq® or AED cardiac monitoring if available.

PHASE 2: IMMEDIATELY PRIOR TO EXTRICATION:

9. Immediately prior to extrication, apply tourniquets to crushed extremities, if possible.

Phase 2 Recommended Additional Resuscitative Drugs

10. Sodium bicarbonate - give 1mEq/kg IV immediately prior to extrication (bristojet 1-2 amps). Additional dosing of sodium bicarbonate may be required if dysrhythmias or cardiac arrest persist after giving calcium chloride or gluconate.

PHASE 3: IMMEDIATELY FOLLOWING EXTRICATION

Cardiac Dysrhythmias or Arrest

11.

CPR **should be** initiated if cardiac arrest develops following extrication. **DO NOT** follow the TCCC guidelines on cardiac arrest.
12. If dysrhythmias are present, consider administering the following (adult doses): Calcium Gluconate 10% 10mL or calcium chloride 10% 5mL IV over 2 minutes.

Calcium should not be given in bicarbonate containing solutions due to precipitation of calcium carbonate.

Calcium chloride should be given SLOW IV push to prevent vein necrosis.

13. Additional dosing of sodium bicarbonate may be required if dysrhythmias or cardiac arrest persist after giving calcium gluconate or calcium chloride.
14. Administer 12mL of albuterol sulfate inhalation solution, 0.083% (2.5mg/3mL) in nebulizer. Onset of effect: 30 minutes. Duration of action: 2 hours.
15. Alternatively, administer albuterol (Ventolin®), 2-3 puffs q 5 minutes, repeat up to 3 times. The metered dose inhaler works best when used with a commercially produces spacer or improvised spacer (e.g., cardboard from toilet paper roll, etc.).
16. Following extrication, once the patient is stabilized, be prepared to treat hyperkalemia as tourniquets are released.

DISPOSITION:
Urgent Surgical evacuation

CRUSH INJURY KIT

Example crush injury kit with enough supplies to provide the initial treatment for 3 casualties with crush syndrome.

Standard size M-9 bag with;

- 6L of NS
- 4 IV starter kits
- 3 drug kits (pelican case), each containing;
    - 100mEq sodium bicarbonate (2 Bristojets)
    - 10mL 10% calcium gluconate aqueous solution (1gm in 10mL vial) (3 ampules)

EQUIPMENT FOR CRUSH INJURY KIT

Item Description	National Stock Number (NSN)
SODIUM CHLORIDE INJECTION 0.9%	6505-01-330-6269

IV ADMINISTRATION SET 6810-00-290-3834

SODIUM BICARBONATE INJECTION 6810-00-290-3834

CALCIUM GLUCONATE INJECTION 6505-00-097-8138

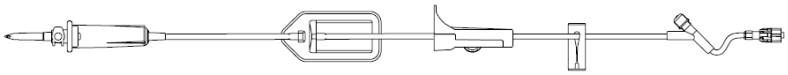
ALBUTEROL INHALER 6505-01-238-4243

SECTION 1

NEBULIZER, ULTRASONIC 6515-01-614-9279

ALBUTEROL SULFATE 2.5 mg/3mL 6505-01-258-0960

INTRAVENOUS INJECTION SET, FILTERED, 0.22 micron 6515-99-001-9683



SECTION 1

FASCIOTOMY PROTOCOL

SPECIAL CONSIDERATIONS:
1. Compartment syndromes require a high index of suspicion.
2. Do not attempt these procedures if not trained or qualified.

SIGNS AND SYMPTOMS

1. Be suspicious of compartment syndrome in the following conditions:
   a. Fractures
   b. Crush injuries
   c. Vascular injury
   d. Circumferential burns
   e. Multiple penetrating injuries (fragmentation)
   f. Blunt trauma
2. Clinical signs: Accurate diagnosis requires a high rate of suspicion.
   a. "Classic: Late Signs - 5Ps"
      i. Pain
      ii. Pallor

      iii. Pulselessness: Be aware that peripheral pulses are present in 90% of patients with compartment syndrome.
      iv. Paresthesia
      v. Paralysis
   b. More common acute findings
      i. Increasing pain
      ii. Pain out of proportion to injury
      iii. Pain with passive motion of muscles in the involved compartment
      iv. Pallor
      v. Paresthesia (numbness)
   c. Increasing swelling, decreasing motion, and increasing pain not responsive to pain medication in the appropriate clinical setting should raise the possibility of a developing compartment syndrome.

   d. Compartment syndromes may take hours or days to develop. For patients with suspected compartment syndromes, re-evaluate q 30min for 2hrs, then q 1hr for 12 hrs, then q 2hr for 24 hrs, and then q 4-6hr for 48 hrs.
   e. Compartment Syndromes may occur in the: thigh, lower leg/ calf, foot, forearm, or hand

MANAGEMENT

1. Orthopedic/Compartment Syndrome Management.
2. Apply traction splints as necessary.
3. Assess fractures and splint in position of function.
4. Check neurovascular status after any manipulation.
5. Use compartment pressure monitor if available
   a. Perfusion pressure = diastolic blood pressure - measured intramuscular pressure
      i. Perfusion Pressure < 30mm is diagnostic for compartment syndrome
      ii. Hypotensive patients have a lowered diastolic pressure and may have increased susceptibility to developing a compartment syndrome.
   b. Repeat measurements if clinically indicated or if patient is obtunded due to narcotic use or head injury
6. Non Surgical Treatment
   a. Pain Management: See ***Pain Management Protocol (TMEP)***

      i. Increasing pain medication requirements may mask development of a compartment syndrome

ii.

Narcotic doses which decrease the patient's level of consciousness and cause drowsiness will oversedate a patient so that the increaing pain of a compartment syndrome is not recognized.

b. Elevation - Maintain extremity at level of the heart. **DO NOT ELEVATE**.

c. Loosen encircling dressings

7. Surgical (Fasciotomy)

a. See ***Procedural Analgesia Protocol (TMEP)*** prior to doing procedures

b.

Only consider fasciotomy if:

i. Evacuation is delayed 6 hrs or longer

ii. **AND fasciotomy is within the scope of practice of the treating medic**

iii. **AND** the following indications exist:

1). Pain with passive motion of the involved muscle group

a). Increasing pain with decreasing response to pain meds

b). Increasing swelling and tightness in the involved compartment

iv. **OR** There are elevated compartment pressures as defined above (#5).

c.

Fasciotomy may be a limb saving procedure in the proper clnical setting. When done for the wrong reasons, or done incorrectly, the potential for serious complications exists.

d. Procedure: Utilize ***Procedural Analgesia Protocol (TMEP)***

i. Thigh: anterior skin incision, ID muscle fascia and split fascia only

ii. Lower leg/ Calf:

1). Anterior and Lateral Compartments:

a). Identify the anterior tibial crest and then identify the fibula. Make the skin incision from the proximal third to the distal third of the foreleg. The incision is located approximately 2cm anterior to the fibula.

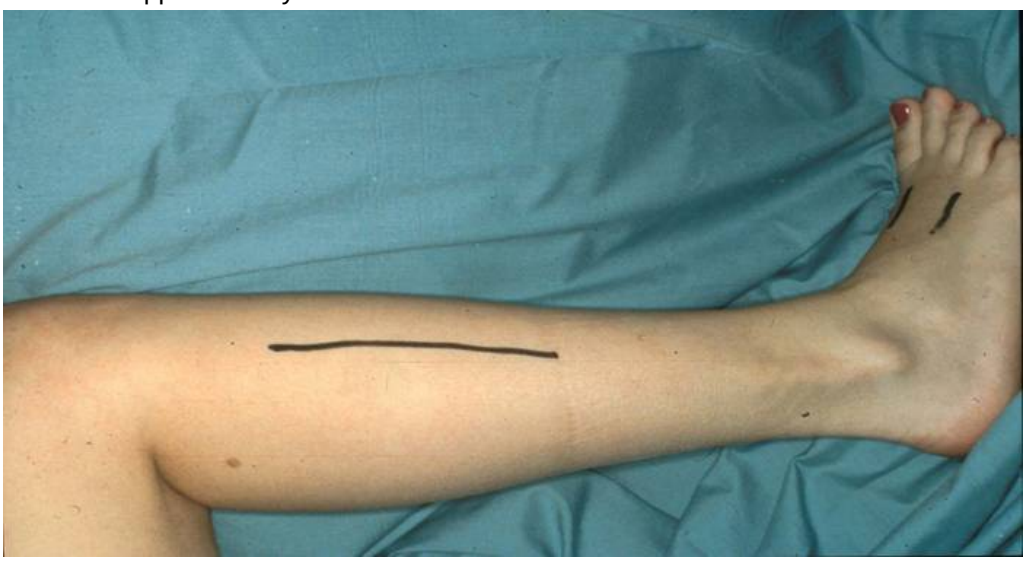


Fig 1: *The incision is anterior to the fibula. The lines on the foot are used ONLY for a foot compartment syndrome.*

b). Identify the intermuscular septum if possible. Make the anterior fascial incision parallel to the tibial crest and about 1 inch lateral to the tibial crest. The fascial incision should be the length of the skin incision. This releases the anterior compartment. To release the lateral compartment, identify the intermuscular septum approximately half way between the fibula and the anterior tibial crest. Posterior to this septum, incise the fascia from the proximal aspect to the distal third of the foreleg.

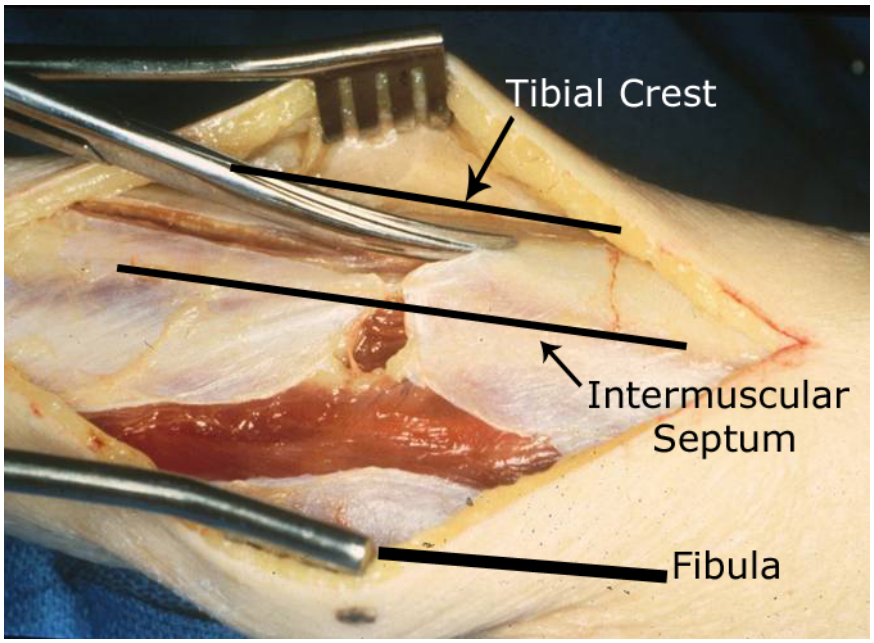


Fig 2: *Identify the tibia, fibula and the intermuscular septum. Make the Fasciotomy incisions anterior and posterior to the septum.*

2). Posterior Compartment:

a). Make an incision at the posteromedial aspect of the calf from the proximal muscle distally to the distal third of the foreleg. ID the fascia and split the fascia of the superficial muscles. To release the deep posterior compartment, develop the interval between posterior border of the tibia and the superficial posterior compartment. Proceed deep along the posterior border of the tibia. Identify the deep posterior compartment and release the fascia. Be careful of the deep neurovascular structures.

Fig. 3: *The dotted line represents the palpable tibial border and the solid line on the tibia represents the incision line. The solid line on the foot is done ONLY for foot compartment syndromes.*

iii. Foot: Make longitudinal incisions between the metacarpals along the dorsal aspect of the foot as shown in figure 1. ID the underlying fascia and incise it. Make a medial foot incision as shown in figure 3 and incise the underlying fascia.

iv. Forearm: Make 20cm longitudinal incisions along the dorsal and volar aspects of the forearm. Identify the underlying fascia and split the fascia. Avoid cutting tendons and nerves.

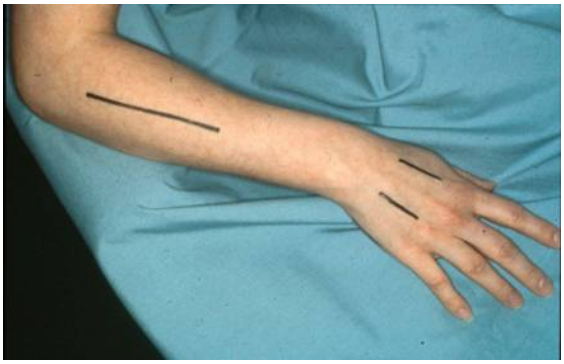


Fig. 4: *Dorsal arm incision for forearm dorsal compartment release. Dorsal hand incisions used only for hand compartment syndrome.*

Fig.5: *Volar arm incision used for forearm compartment syndrome release.*

v. Hand: Make a 5cm longitudinal incision between the 2nd and 3rd, and the 3rd and 4th metacarpals on the dorsal aspect of the hand as shown in figure 4. Avoid cutting the extensor tendons. Split the underlying fascia.

e. Leave all wounds open and apply dressings.

DISPOSITION:
Urgent evacuation

MILD TRAUMATIC BRAIN INJURY (MTBI) PROTOCOL

SPECIAL CONSIDERATIONS:

1. Mandatory events requiring MACE:
   a. Personnel in a vehicle associated with a blast, collision or rollover
   b. Personnel within 150 meters of a blast
   c. Personnel with a direct blow to the head
   d. Command directed evaluation
2. NOT allow a patient with an mTBI to return to duty while they are symptomatic. This puts them at significant risk for greater injury (to include death) if they sustain another head injury while still symptomatic.
3. mTBI is primarily a clinical diagnosis. If you do not feel that a patient is back to their baseline, do not allow them to RTD and consult a medical provider

SIGNS AND SYMPTOMS:

1. **Red Flags (Symptoms):**
   a. Neurological
      i. Witnessed loss of consciousness
      ii. Amnesia/memory problems
      iii. Unusual behavior/combative
      iv. Seizures
      v. Worsening headache
      vi. Cannot recognize people
      vii. Disoriented to time and/or place
      viii. Abnormal speech
   b. Eyes-Double vision
   c. General
      i. 2 or more blast exposures within 72 hours
      ii. Repeated vomiting
      iii. Weakness
      iv. Unsteady on feet

MANAGEMENT:

1. Consider mTBI (concussion) in anyone who is dazed, confused, "saw stars", lost consciousness (even if just momentarily) or has memory loss that results from a fall, explosion, motor vehicle crash or any other event involving abrupt head movement, a direct blow to the head or other head injury.
2. Triage and treat other injuries as required. As soon as tactically feasible evaluate for mTBI.
3. Red Flags present-If red flags are present, consult with medical provider for possible urgent evacuation.
4. Administer MACE
   a. If MACE <25 or symptoms persist despite rest and appropriate treatment consult with medical provider for possible priority evacuation.
   b. If MACE is normal: Recommend 24 hour rest and re-evaluate
5. Follow Service specific, DVBIC, Joint Trauma System (JTS) Clinical Practice Guidelines (CPGs)
6.

Contraindications:
   a. If possible, avoid the use of Cox 1 NSAID medication (ibuprofen (Motrin®), naproxen (Aleve®)) due to effects on platelets and a potentially increased risk of bleeding. If COX 1 NSAIDS are the only medication available and the patient has no red flags they MAY be used to treat the headache.
   b. Avoid the use of tramadol (Ultram®) due to its effects on platelets, increased bleeding and altered level of consciousness.
   c. Avoid the use of diphenhydramine (Benadryl®) due to possibly alteration of the patient's level of consciousness**.**
   d. Avoid the use of narcotics due to alteration of the patient's level of consciousness.

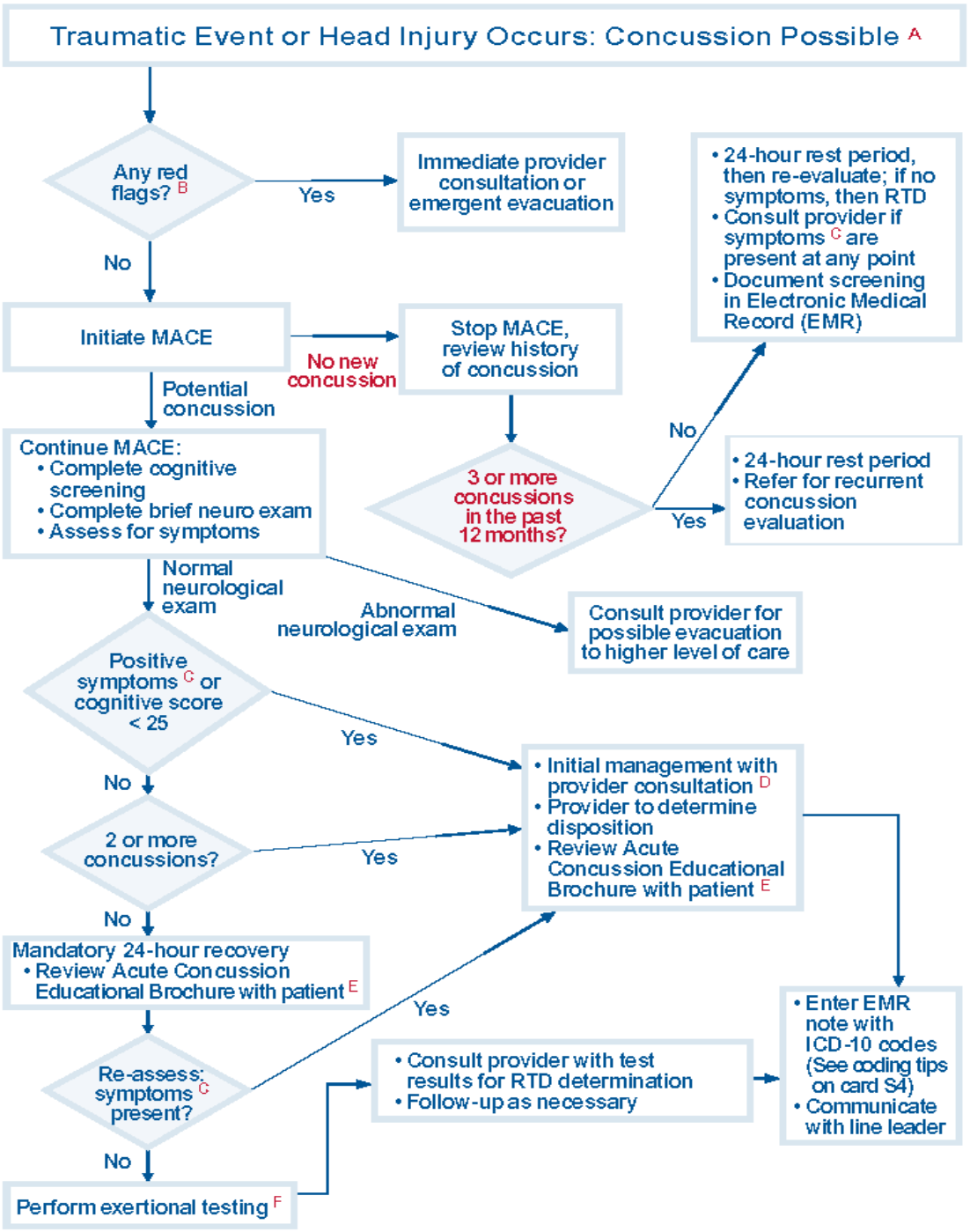
DISPOSITION:

1. *Urgent* evacuation in the presence of Red Flags
2. *Priority* evacuation in the presence of MACE <25 and persistent symptoms despite appropriate treatment and rest
3. *Routine* evacuation MACE persistently <25 OR MACE >25 and persistent symptoms despite appropriate treatment

1. Concussion Management in Deployed Settings

COMBAT MEDIC/CORPSMAN ALGORITHM

(Pre-hospital/no medical officer in the immediate area)

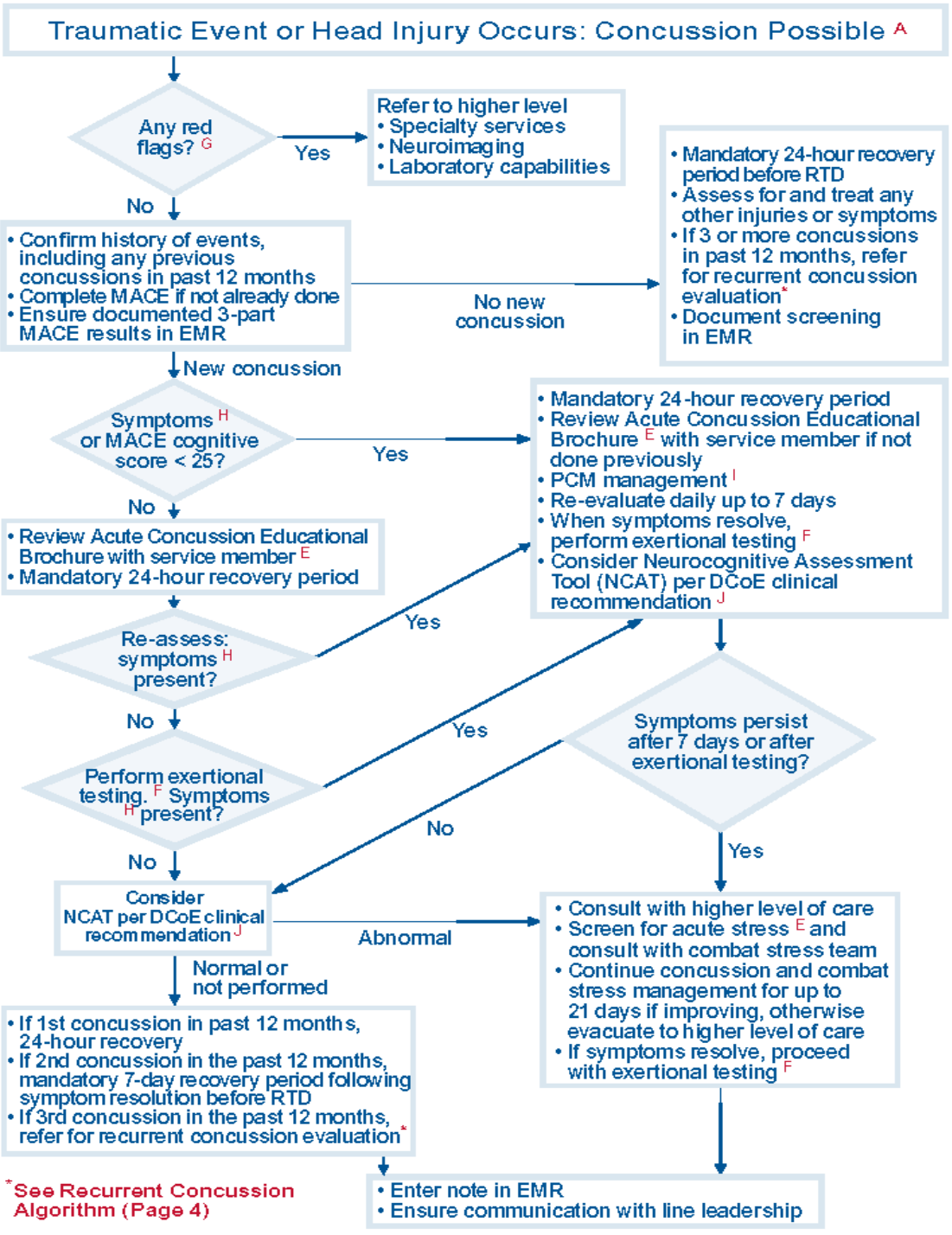

Traumatic Event or Head Injury Occurs: Concussion Possible A
Any red flags? B
Yes
Immediate provider consultation or emergent evacuation
No
Initiate MACE
No new concussion
Stop MACE, review history of concussion
Potential concussion
Continue MACE:
• Complete cognitive screening
• Complete brief neuro exam
• Assess for symptoms
3 or more concussions in the past 12 months?
No
• 24-hour rest period, then re-evaluate; if no symptoms, then RTD
• Consult provider if symptoms C are present at any point
• Document screening in Electronic Medical Record (EMR)
Yes
• 24-hour rest period
• Refer for recurrent concussion evaluation
Normal neurological exam
Abnormal neurological exam
Consult provider for possible evacuation to higher level of care
Positive symptoms C or cognitive score < 25
Yes
No
2 or more concussions?
Yes
No
• Initial management with provider consultation D
• Provider to determine disposition
• Review Acute Concussion Educational Brochure with patient E
Mandatory 24-hour recovery
• Review Acute Concussion Educational Brochure with patient E
Re-assess: symptoms C present?
Yes
No
• Consult provider with test results for RTD determination
• Follow-up as necessary
• Enter EMR note with ICD-10 codes (See coding tips on card S4)
• Communicate with line leader
Perform exertional testing F

Priority: Quickly assess for red flags

SECTION 1

2. Concussion Management in Deployed Settings

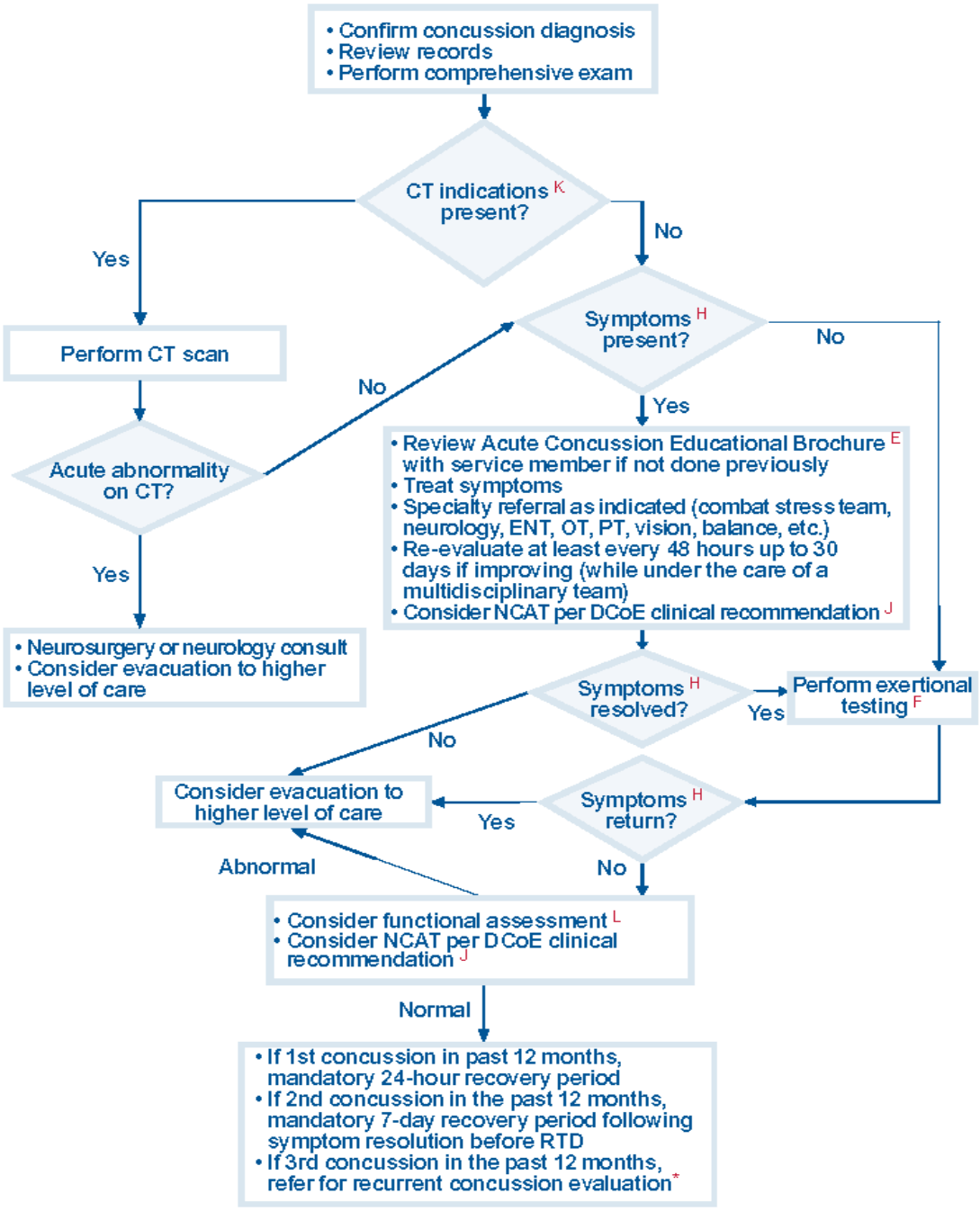
INITIAL PROVIDER ALGORITHM
(Management of Concussion in Deployed Setting)


Traumatic Event or Head Injury Occurs: Concussion Possible A
Any red flags? G
Yes
Refer to higher level
• Specialty services
• Neuroimaging
• Laboratory capabilities
No
• Confirm history of events, including any previous concussions in past 12 months
• Complete MACE if not already done
• Ensure documented 3-part MACE results in EMR
No new concussion
• Mandatory 24-hour recovery period before RTD
• Assess for and treat any other injuries or symptoms
• If 3 or more concussions in past 12 months, refer for recurrent concussion evaluation*
• Document screening in EMR
New concussion
Symptoms H or MACE cognitive score < 25?
Yes
• Mandatory 24-hour recovery period
• Review Acute Concussion Educational Brochure E with service member if not done previously
• PCM management I
• Re-evaluate daily up to 7 days
• When symptoms resolve, perform exertional testing F
• Consider Neurocognitive Assessment Tool (NCAT) per DCoE clinical recommendation J
No
• Review Acute Concussion Educational Brochure with service member E
• Mandatory 24-hour recovery period
Re-assess: symptoms H present?
Yes
No
Perform exertional testing. F Symptoms H present?
Yes
Symptoms persist after 7 days or after exertional testing?
No
Yes
No
Consider NCAT per DCoE clinical recommendation J
Abnormal
• Consult with higher level of care
• Screen for acute stress E and consult with combat stress team
• Continue concussion and combat stress management for up to 21 days if improving, otherwise evacuate to higher level of care
• If symptoms resolve, proceed with exertional testing F
Normal or not performed
• If 1st concussion in past 12 months, 24-hour recovery
• If 2nd concussion in the past 12 months, mandatory 7-day recovery period following symptom resolution before RTD
• If 3rd concussion in the past 12 months, refer for recurrent concussion evaluation*
*See Recurrent Concussion Algorithm (Page 4)
• Enter note in EMR
• Ensure communication with line leadership

3. Concussion Management in Deployed Settings

COMPREHENSIVE CONCUSSION ALGORITHM

(Referral to military treatment facility with neuroimaging capabilities)


• Confirm concussion diagnosis
• Review records
• Perform comprehensive exam
CT indications [K] present?
Yes
No
Perform CT scan
Acute abnormality on CT?
No
Yes
• Neurosurgery or neurology consult
• Consider evacuation to higher level of care
Symptoms [H] present?
No
Yes
• Review Acute Concussion Educational Brochure [E] with service member if not done previously
• Treat symptoms
• Specialty referral as indicated (combat stress team, neurology, ENT, OT, PT, vision, balance, etc.)
• Re-evaluate at least every 48 hours up to 30 days if improving (while under the care of a multidisciplinary team)
• Consider NCAT per DCoE clinical recommendation [J]
Symptoms [H] resolved?
Yes
Perform exertional testing [F]
No
Consider evacuation to higher level of care
Yes
Symptoms [H] return?
Abnormal
No
• Consider functional assessment [L]
• Consider NCAT per DCoE clinical recommendation [J]
Normal
• If 1st concussion in past 12 months, mandatory 24-hour recovery period
• If 2nd concussion in the past 12 months, mandatory 7-day recovery period following symptom resolution before RTD
• If 3rd concussion in the past 12 months, refer for recurrent concussion evaluation*

*See Recurrent Concussion Algorithm (Page 4)

RECURRENT CONCUSSION EVALUATION

(three or more documented in 12-month span)

1. Comprehensive neurological evaluation by neurologist or otherwise qualified provider
   - Review of prior concussion history with focus on timeline or resolution of symptoms
   - Assessment of symptoms (face-to-face interview by provider)
     Consider:
     - Neurobehavioral Symptom Inventory [E]
     - Acute Stress Reaction Questionnaire [E]
   - Balance assessment [M]

2. Neuroimaging per provider judgement

3. Neuropsychological assessment by psychologist
   - Evaluate: attention, memory, processing speed and executive function
   - Perform a psychosocial and behavioral assessment
   - Include measure of effort
   - Consider NCAT per DCoE clinical recommendation [J]

4. Functional assessment [L] completed by occupational therapy/physical therapy

5. Neurologist (or qualified provider) determines RTD status

S1 Concussion Management in Deployed Settings

Traumatic Event or Head Injury Occurs: Concussion Possible

A Mandatory Events Requiring Concussion Evaluation:

1. Any service member in a vehicle associated with a blast event, collision or rollover
2. Any service member within 50 meters of a blast (inside or outside)
3. Anyone who sustains a direct blow to the head
4. Command directed — such as, but not limited to, repeated exposures

B Medic/Corpsman Algorithm Red Flags:

1. Witnessed loss of consciousness (LOC)
2. Two or more blast exposures within 72 hrs
3. Unusual behavior/combative
4. Unequal pupils
5. Seizures
6. Repeated vomiting
7. Double vision/loss of vision
8. Worsening headache
9. Weakness on one side of the body
10. Cannot recognize people or disoriented to place
11. Abnormal speech

C Medic/Corpsman Algorithm Symptoms:

(Persisting beyond initial traumatic event)

1. Headache
2. Dizziness
3. Memory problems
4. Balance problems
5. Nausea/vomiting
6. Difficulty concentrating
7. Irritability
8. Visual disturbances
9. Ringing in the ears
10. Other_____

D Medic/Corpsman Initial Management of Concussion:

1. Give Acute Concussion Educational Brochure to all concussion patients, available at: dvbic.dcoe.mil
2. Reduce environmental stimuli
3. Mandatory 24-hour recovery period
4. Aggressive headache management
   – Use acetaminophen q 6 hrs x 48 hrs
   After 48 hours may use naproxen prn
5. Avoid tramadol, Fioricet, excessive triptans and narcotics

E Available Resources (dvbic.dcoe.mil):

- Acute Stress Reaction Questionnaire
- Acute Concussion Educational Brochure
- Neurobehavioral Symptom Inventory
- Line Leader Fact Sheet
- Coding Guidance
- DCoE Neurocognitive Assessment Tool (NCAT) Recommendation

S2 Concussion Management in Deployed Settings

F Exertional Testing:

1. Exert to 65-85% of target heart rate (THR=220-age) using push-ups, sit-ups, running in place, step aerobic, stationary bike, treadmill and/or hand crank
2. Maintain this level of exertion for approximately 2 minutes
3. Assess for symptoms (headache, vertigo, photophobia, balance, dizziness, nausea, visual changes, etc.)
4. If symptoms/red flags exist with exertional testing, stop testing, and consult with provider

G Provider Algorithm Red Flags:

1. Progressively declining level of consciousness
2. Progressively declining neurological exam
3. Pupillary asymmetry
4. Seizures
5. Repeated vomiting
6. Clinically verified GCS < 15
7. Neurological deficit: motor or sensory
8. LOC > 5 minutes
9. Double vision
10. Worsening headache
11. Cannot recognize people or disoriented to place
12. Slurred speech
13. Unusual behavior

H Provider Algorithm Symptoms:

1. Confusion (24 hours)
2. Irritability
3. Unsteady on feet
4. Vertigo/dizziness
5. Headache
6. Photophobia
7. Phonophobia
8. Sleep issues

I Primary Care Management (PCM):

1. Give Acute Concussion Educational Brochure to all concussion patients, available at: dvbic.dcoe.mil
2. Reduce environmental stimuli
3. Mandatory 24-hour recovery period
4. Aggressive headache management
   – Use acetaminophen q 6 hrs x 48 hrs
   After 48 hours may use naproxen prn
5. Avoid tramadol, Fioricet, excessive triptans and narcotics
6. Consider nortriptyline q HS or amitriptyline q HS for persistent headache (> 7 days). Prescribe no more than 10 pills.
7. Implement duty restrictions
8. Review current medications and sleep hygiene (Healthy Sleep Fact Sheet available at dvbic.dcoe.mil) and consider short-term low dose non-benzodiazepine hypnotic (e.g., zolpidem 5mg)
9. Pain management if applicable
10. Send consult to med.consult.army@mail.mil for further guidance if needed
11. Consider evacuation to higher level of care if clinically indicated
12. Document concussion diagnosis in EMR

med.consult.army@mail.mil is a Department of Defense email consultation service provided by the Army OTSG Telemedicine Teleconsultation Programs to assist deployed clinicians with the treatment of TBI and RTD decisions.

S3 Concussion Management in Deployed Settings

J DCoE Neurocognitive Assessment Tool (NCAT) Recommendation:

Current DoD policy is that all service members must be tested with a neurocognitive assessment tool (NCAT) prior to deployment. Among several tests that are available, the DoD has selected the Automated Neuropsychological Assessment Metrics (ANAM) as the NCAT to use for both pre-deployment baseline testing and for post-concussion assessment in theater. Detailed instructions for administering a post-injury ANAM are provided at dvbic.dcoe.mil.

For ANAM baseline results send requests to:
usarmy.jbsa.medcom.mbx.otsg--anam-baselines@mail.mil

K CT Indications:*

1. Physical evidence of trauma above the clavicles
2. Seizures
3. Vomiting
4. Headache
5. Age > 60
6. Drug or alcohol intoxication
7. Coagulopathy
8. Focal neurologic deficits

* Haydel MJ, Preston CA, Mills TJ, Luber S, Blaudeau E, DeBlieux PM. Indications for computed tomography in patients with minor head injury. N Engl J Med. 2000 Jul 13;343(2):100-5.

L Functional Assessment:

Assess the service member's performance of military-relevant activities that simulate the multi-system demands of duty in a functional context. Selected assessment activities should concurrently challenge specific vulnerabilities associated with mTBI including cognitive (such as executive function), sensorimotor (such as balance and gaze stability), and physical endurance. Rehabilitation providers should not only evaluate the service member's performance but also monitor symptoms before, during and after functional assessment.

M The Balance Error Scoring System (BESS - Modified):**

Stand on flat surface, eyes closed, hands on hips in 3 positions:

1. On both feet (20 seconds)
2. On one foot (20 seconds)
3. Heel-to-toe stance (20 seconds)

For each position, score 1 point for any of the following errors:

1. Stepping, stumbling or falling
2. Opening eyes
3. Hands lifted above the iliac crests
4. Forefoot or heel lifted
5. Hip moved > 30 degrees flexion or abduction
6. Out of test position > 5 seconds

Score 10 points if unable to complete

Total Balance Score_____

** Guskiewicz KM, Ross SE, Marshall SW. Postural Stability and Neuropsychological Deficits After Concussion in Collegiate Athletes. J Athl Train. 2001 Sep;36(3):263-273.

S4 Concussion Management in Deployed Settings

2015 DoD Definition of Traumatic Brain Injury:

A traumatically induced structural injury or physiological disruption of brain function, as a result of an external force, that is indicated by new onset or worsening of at least one of the following clinical signs immediately following the event:

- Any alteration in mental status (e.g., confusion, disorientation, slowed thinking, etc.).
- Any loss of memory for events immediately before or after the injury.
- Any period of loss of or a decreased level of consciousness, observed or self-reported.

Coding Tips:

1. Primary code (corpsman/medics require co-sign)
   - S06.0X0A - Concussion without LOC
   - S06.0X1A - Concussion with LOC ≤ 30 min.
2. Z787.802- Personal history of other TBI (healed) physical injury and trauma
3. Symptom codes
   - As appropriate
4. Deployment status code
   - Z56.82 - During deployment encounter
5. Screening code for TBI
   - DOD0122
6. External cause of injury code
   - Y36.290A (if applicable) - Operations involving explosions and fragments

Key Algorithm Directives:

- Personnel are required to use the algorithms to treat concussion in the deployed setting
- Mandatory event-driven protocols for exposure to potentially concussive events
  - Requires a medical evaluation and minimum 24-hour rest period
- All sports and activities with risk of concussion are prohibited until after a 24-hour rest period
- Military Acute Concussion Evaluation (MACE) documentation will address all 3 MACE parts
- Service members diagnosed with concussion will be given the Acute Concussion Educational Brochure available at: dvbic.dcoe.mil
- Specific protocols for anyone sustaining ≥ 2 concussions within 12 months

MACE Documentation

Document using the mnemonic "CNS"

(1) C – Cognitive score
(2) N – Neurological exam reported as normal or abnormal
(3) S – Symptoms reported as present or absent

If a head injury event or AOC/LOC/PTA is not reported, then a concussion has not occurred. The MACE is stopped because the cognitive portion is not valid in non-concussed patients. Evaluate and treat any other symptoms or injuries, and document the event in the EMR. The MACE score should be reported as N/A.

Repeat MACE Tips:

Repeating the MACE's cognitive exam with a different version (A-F) may be used to evaluate acute concussion recovery; however, a physical exam and symptom assessment must accompany any repeated cognitive exam. Providers should be mindful of other factors affecting the MACE cognitive score such as sleep deprivation, medications or pain.

PUID 4148
Released: August 2012 | Revised: March 2017
This product is reviewed annually and current until superseded. Visit dvbic.dcoe.mil for the latest information.
DVBIC is the TBI operational component of the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury.

Defense Centers of Excellence
for Psychological Health and Traumatic Brain Injury
Defense and Veterans Brain Injury Center
1335 East West Highway | Suite 6-100 | Silver Spring, Maryland 20910
dvbic.dcoe.mil | dcoe.mil
DCoE Outreach Center 866-966-1020

MACE 2

Military Acute Concussion Evaluation

Use MACE 2 as close to time of injury as possible.

Service Member Name: _____

DoDI/EDIPI/SSN: _____ Branch of Service & Unit: _____

Date of Injury: _____ Time of Injury: _____

Examiner: _____

Date of Evaluation: _____ Time of Evaluation: _____

Purpose: MACE 2 is a multimodal tool that assists providers in the assessment and diagnosis of concussion. The scoring, coding and steps to take after completion are found at the end of the MACE 2.

Timing: MACE 2 is most effective when used as close to the time of injury as possible. The MACE 2 may be repeated to evaluate recovery.

RED FLAGS

Evaluate for red flags in patients with Glasgow Coma Scale (GCS) 13-15.

- ❑ Deteriorating level of consciousness
- ❑ Double vision
- ❑ Increased restlessness, combative or agitated behavior
- ❑ Repeat vomiting
- ❑ Results from a structural brain injury detection device (if available)
- ❑ Seizures
- ❑ Weakness or tingling in arms or legs
- ❑ Severe or worsening headache

Defer MACE 2 if any red flags are present. Immediately consult higher level of care and consider urgent evacuation according to evacuation precedence/Tactical Combat Casualty Care (TCCC).

- ❑ **Negative for all red flags**
  Continue MACE 2, and observe for red flags throughout evaluation.

MILITARY ACUTE CONCUSSION SCREENING

Complete this section to determine if there was an injury event AND an alteration of consciousness or memory.

1. Description of Incident

A. Record the event as described by the service member or witness.

Use open-ended questions to get as much detail as possible.

_____

_____

_____

_____

Key questions:

- ❑ Can you tell me what you remember?
- ❑ What happened?
- ❑ Who were you last with?

B. Observable Signs

At the time of injury were any of these observable signs witnessed?
Visual clues that suggest a possible concussion include:

- ❑ Lying motionless on the ground
- ❑ Slow to get up after a direct or indirect blow to the head
- ❑ Disorientation, confusion, or an inability to respond appropriately to questions
- ❑ Blank or vacant look
- ❑ Balance difficulties, stumbling, or slow labored movements
- ❑ Facial injury after head trauma
- ❑ Negative for all observable signs

C. Record the type of event.

Check all that apply:

☐ Blunt object	☐ Sports injury	☐ Gunshot wound
☐ Fall	☐ Assault	☐ Explosion/blast Estimated distance ____
☐ Fragment	☐ Motor vehicle crash	☐ Other _____

D. Was there a blow or jolt to the head?

- ❑ Did your head hit any objects?
- ❑ Did any objects strike your head?
- ❑ Did you feel a blast wave? (A blast wave that is felt striking the body or head is considered a blow to the head.)
- ❑ Did you have a head acceleration or deceleration?

☐ **YES** ☐ **NO** ☐ **UNKNOWN**

SECTION 1

2. Alteration of Consciousness or Memory

A. Was there alteration of consciousness (AOC)?
AOC is temporary confusion or "having your bell rung."

☐ YES ☐ NO

If yes, for how long? _____ seconds
_____ minutes

☐ UNKNOWN

Key questions:
- ❑ Were you dazed, confused, or did you "see stars" immediately after the event?
- ❑ Did you feel like you were in a fog, slowed down, or "something was not right"?

B. Was there loss of consciousness (LOC)?
LOC is temporarily passing out or blacking out.

☐ YES ☐ NO

If yes, for how long? _____ seconds
_____ minutes

☐ UNKNOWN

Key questions:
- ❑ Did you pass out or black out?
- ❑ Is there a period of time you cannot account for?

C. Was there any post traumatic amnesia (PTA)?
PTA is a problem remembering part or all of the injury events.

☐ YES ☐ NO

If yes, for how long? _____ seconds
_____ minutes

☐ UNKNOWN

Key questions:
- ❑ Is there a period of time you cannot account for?
- ❑ What is the last thing you remember before the event?
- ❑ What is the first thing you remember after the event?

D. Was the AOC, LOC or PTA witnessed?

☐ YES ☐ NO

If yes, for how long? _____ seconds
_____ minutes

☐ UNKNOWN

Tips for assessment:
- ❑ Ask witness to verify AOC, LOC or PTA and estimate duration.

3. Symptoms

Common symptoms after a concussion are listed below. For this event, check all that apply.

- ❑ Headache
- ❑ Dizziness
- ❑ Memory problems
- ❑ Balance problems
- ❑ Nausea/vomiting
- ❑ Difficulty concentrating
- ❑ Irritability
- ❑ Visual disturbances
- ❑ Ringing in the ears
- ❑ Other _____
- ❑ **Negative for all symptoms**

4. History

A. During the past 12 months, were you diagnosed with a concussion, not counting this event?

☐ YES ☐ NO

If yes, how many? ____

☐ UNKNOWN

B. History of diagnosed/treated headache disorder or migraine.

☐ YES ☐ NO

C. History of depression, anxiety, or other behavioral health concerns.

☐ YES ☐ NO

CONCUSSION SCREENING RESULTS (Possible Concussion?)

Was there a blow or jolt to the head (1D)
AND
ANY alteration of consciousness or memory? (2A, 2B, 2C, or 2D)

YES (to both) ⬇

POSITIVE CONCUSSION SCREEN:

1. **Continue** MACE 2.
2. Complete evaluation before prescribing rest.
3. Communicate findings to line leadership.
4. Document and code findings in electronic health record (EHR).

NO (to either or both) ⬇

NEGATIVE CONCUSSION SCREEN:

1. **Stop** MACE 2.
2. Initiate 24 hour-rest period, if deployed. During rest, avoid activities that worsen symptoms. Follow up with the service member after rest period per concussion management tool (CMT).
3. Communicate findings to line leadership.
4. Document and code findings in electronic health record (EHR).

COGNITIVE EXAM

5. Orientation

Score one point for each correct response.

Ask This Question	Incorrect	Correct
"What month is this?"	0	1
"What is the date or day of the month?"	0	1
"What day of the week is it?"	0	1
"What year is it?"	0	1
"What time do you think it is?"	0	1
Correct response must be within one hour of actual time.		

ORIENTATION TOTAL SCORE ____/5

6. Immediate Memory

Choose one list (A-F below) and use that list for the remainder of the MACE 2.

Read the script for each trial and then read all five words. Circle the response for each word for each trial. Repeat the trial three times, even if the service member scores perfectly on any of the trials.

Trial 1 script: Read the script exactly as written.

- *"I am going to test your memory. I will read you a list of words and when I am done, repeat back to me as many words as you can remember, in any order."*

Trials 2 and 3 script: Read the script exactly as written.

- *"I am going to repeat that list again. Repeat back to me as many words as you can remember, in any order, even if you said them before."*

	Trial 1		Trial 2		Trial 3	
List A	Incorrect	Correct	Incorrect	Correct	Incorrect	Correct
Jacket	0	1	0	1	0	1
Arrow	0	1	0	1	0	1
Pepper	0	1	0	1	0	1
Cotton	0	1	0	1	0	1
Movie	0	1	0	1	0	1

IMMEDIATE MEMORY TOTAL SCORE ____/15

Immediate Memory Alternate Word Lists

List B	List C	List D	List E	List F
Dollar	Finger	Baby	Candle	Elbow
Honey	Penny	Monkey	Paper	Apple
Mirror	Blanket	Perfume	Sugar	Carpet
Saddle	Lemon	Sunset	Sandwich	Saddle
Anchor	Insect	Iron	Wagon	Bubble

NEUROLOGICAL EXAM

7. Speech Fluency

☐ Normal
☐ Abnormal

- Speech should be fluid and effortless
  – no pauses or unnatural breaks.
  – Stuttering or struggling to speak is abnormal.

8. Word Finding

☐ Normal
☐ Abnormal

- Assess difficulties with word finding:
  – Difficulty in coming up with the name of an object or grasping to find words is abnormal.

9. Grip Strength

☐ Normal
☐ Abnormal

- Assess grip strength. Grip strength should be strong and equal bilaterally.
  – Unequal or weak grip strength is abnormal.

10. Pronator Drift

☐ Normal
☐ Abnormal

- Direct service member to stand with eyes closed and arms extended forward, parallel to the ground with palms up. Assess for five to 10 seconds:
  – Any arm or palm drift is abnormal.

11. Single Leg Stance

☐ Normal
☐ Abnormal

- Remove shoes if possible. Have service member stand on one leg, arms across chest, hands touching shoulders, eyes open initially. Once service member is balanced, have them close their eyes and time for 15 seconds how long they can maintain their balance. Repeat test with opposite leg.
  – Loss of balance on either leg before eight seconds is abnormal.

NEUROLOGICAL EXAM - Continued

12. Tandem Gait

☐ Normal
☐ Abnormal

- Remove shoes if possible. Have service member take six steps one foot in front of the other, heel-to-toe, with arms at side
  - Stumbling or shifting feet is abnormal.

13. Pupil Response

☐ Normal
☐ Abnormal

- Pupils should be round, equal in size and briskly constrict to a direct, bright light.
  - Unequal pupil size, dilation or constriction delay is abnormal.

14. Eye Tracking

☐ Normal
☐ Abnormal

- Both eyes should smoothly track your finger side-to-side and up and down.
  - Unequal, irregular or delayed eye tracking is abnormal.

NEUROLOGICAL EXAM RESULTS (Questions 7-14)

☐ All Normal ☐ Any Abnormal

COGNITIVE EXAM

15. Concentration

A. Reverse Digits

Read the script and begin the trial by reading the first string of numbers in Trial 1.

Circle the response for each string.

- If correct on string length of Trial 1, proceed to the next longer string length in the same column.
- If incorrect on string length of Trial 1, move to the same string length of Trial 2.
- If incorrect on both string lengths in Trials 1 and 2, **STOP** and record score as zero for that string length. Record total score as sum of previous correct trials.

COGNITIVE EXAM - Continued

15. Concentration - Continued

A. Reverse Digits

Script: Read the script exactly as written.

- *"I am going to read you a string of numbers. When I am finished, repeat them back to me backward. That is, in reverse order of how I read them to you. For example, if I said 7 - 1 - 9, then you would say 9 - 1 - 7."*

List A			
Trial 1	**Trial 2** (if Trial 1 is incorrect)	**Incorrect**	**Correct**
4-9-3	6-2-9	**0**	**1**
3-8-1-4	3-2-7-9	**0**	**1**
6-2-9-7-1	1-5-2-8-5	**0**	**1**
7-1-8-4-6-3	5-3-9-1-4-8	**0**	**1**

REVERSE DIGITS SCORE (16A) ____/4

SECTION 1

Concentration Alternate Number Lists

Note: Use the same list (A-F) that was used in Question 6.

List B	
Trial 1	**Trial 2**
5-2-6	4-1-5
1-7-9-5	4-9-6-8
4-8-5-2-7	6-1-8-4-3
8-3-1-9-6-4	7-2-7-8-5-6

List C	
Trial 1	**Trial 2**
1-4-2	6-5-8
6-8-3-1	3-4-8-1
4-9-1-5-3	6-8-2-5-1
3-7-6-5-1-9	9-2-6-5-1-4

List D	
Trial 1	**Trial 2**
7-8-2	9-2-6
4-1-8-3	9-7-2-3
1-7-9-2-6	4-1-7-5-2
2-6-4-8-1-7	8-4-1-9-3-5

List E	
Trial 1	**Trial 2**
3-8-2	5-1-8
2-7-9-3	2-1-6-9
4-1-8-6-9	9-4-1-7-5
6-9-7-3-8-2	4-2-7-9-3-8

List F	
Trial 1	**Trial 2**
2-7-1	4-7-9
1-6-8-3	3-9-2-4
2-4-7-5-8	8-3-9-6-4
5-8-6-2-4-9	3-1-7-8-2-6

COGNITIVE EXAM - Continued

15. Concentration - Continued

B. Months in Reverse Order

Script: Read the script exactly as written.

- *"Now tell me the months of the year in reverse order. Start with the last month and go backward. So you'll say: December, November…Go ahead."*

Correct Response:

Dec – Nov – Oct – Sep – Aug – Jul – Jun – May – Apr – Mar – Feb – Jan

	Incorrect	Correct
ALL months in reverse order	0	1

MONTHS IN REVERSE ORDER (16B) ___/1

CONCENTRATION TOTAL SCORE ___/5

Sum of scores:
15A (0-4 points) and 15B (0 or 1 point)

16. Delayed Recall

Read the script and circle the response for each word. Do NOT repeat the word list.
Note: Use the same list (A-F) that was used in Question 6.

Script: Read the script exactly as written.

- *"Do you remember that list of words I read a few minutes earlier? I want you to tell me as many words from that list as you can remember. You can say them in any order."*

List A	Incorrect	Correct
Jacket	0	1
Arrow	0	1
Pepper	0	1
Cotton	0	1
Movie	0	1

DELAYED RECALL TOTAL SCORE ___/5

Delayed Recall Alternate Word Lists

List B	List C	List D	List E	List F
Dollar	Finger	Baby	Candle	Elbow
Honey	Penny	Monkey	Paper	Apple
Mirror	Blanket	Perfume	Sugar	Carpet
Saddle	Lemon	Sunset	Sandwich	Saddle
Anchor	Insect	Iron	Wagon	Bubble

17. Vestibular/Ocular-Motor Screening (VOMS) for Concussion Instructions

VOMS Contraindication: Unstable Cervical Spine.

Consider defering VOMS if patient is overtly symptomatic or a trained provider unavailable. VOMS should be completed before return to duty. Use comment section for any provider-observed difficulty with specific VOMS tasks.

A. **Baseline symptoms.** Record headache, dizziness, nausea and fogginess (HDNF), on zero to 10 scale prior to screening.

B. **Smooth pursuits**. Service member and examiner are seated. Hold fingertip three feet from patient. Service member focuses on fingertip target as examiner moves fingertip smoothly horizontally one and a half feet right and left of midline at rate requiring two seconds to go fully from left to right and right to left. Perform twice. Repeat in vertical direction one and a half feet above and one and a half feet below midline up and down, moving eyes two seconds fully up and two seconds down. Perform twice. Record HDNF on a zero to 10 scale.

C. **Saccades**. Service member and examiner are seated.

1) **Horizontal saccades:** Hold two fingertips horizontally at a distance of three feet from service member, and one and a half feet left and right of midline so service member gazes 30 degrees left and right. Service member moves eyes as quickly as possible from point to point. Perform 10 times. Record HDNF on a zero to 10 scale.
2) **Vertical saccades:** Repeat with two fingertips vertically three feet from service member, and one and a half feet above and below midline so service member gazes 30 degrees upward and downward. Service member moves eyes as quickly as possible from point to point. Perform 10 times. Record HDNF on a zero to 10 scale.

D. **Convergence**. Service member and provider are seated facing each other. Service member focuses on font target (page 14) at arm's length and slowly brings toward tip of nose. Service member stops target when two distinct images seen or when outward deviation of eye observed. Repeat and measure three times. Record centimeters between target and tip of nose for each trial. A near point of convergence ≥ five centimeters from the tip of the nose is considered abnormal. Record HDNF on a zero to 10 scale.

17. Vestibular/Ocular-Motor Screening (VOMS) for Concussion Instructions (Continued)

E. Vestibular-ocular reflex (VOR) test. Service member and examiner are seated. Examiner holds font target (page 14) in front of service member in midline at three feet, rotation speed set with metronome.

1) **Horizontal VOR test:** Service member rotates head horizontally focusing on target at 20 degrees to each side. Rotation = 180 beats per minute (bpm). Perform 10 times. Record: HDNF 10 seconds after test.

2) **Vertical VOR test:** Repeat test moving head vertically 20 degrees up and down at 180 bpm. Perform 10 times. Record HDNF 10 seconds after test.

F .Visual motion sensitivity (VMS) test. Service member stands with feet shoulder width apart, facing a busy area. Examiner stands next to and slightly behind service member. Service member outstretches arm. Focusing on their thumb, the service member rotates head,eyes and trunk as unit 80 degrees right and left. Rotation = 50 bpm. Perform five times. Record HDNF on a zero to 10 scale.

17. VOMS Score Card

Vestibular/Ocular Motor Test:	Not Tested	Headache 0-10	Dizziness 0-10	Nausea 0-10	Fogginess 0-10	Comments
BASELINE SYMPTOMS:	N/A					
Smooth Pursuits						
Saccades – Horizontal						
Saccades – Vertical						
Convergence (Near Point)						(Near Point in cm): Measure 1: _____ Measure 2:_____ Measure 3:_____
VOR – Horizontal						
VOR – Vertical						
Visual Motion Sensitivity Test						
Total						

Any score above baseline is considered abnormal

VOMS RESULTS

☐ All Normal ☐ Any Abnormal

EXAM SUMMARY

Record the data for correct MACE 2 documentation.

Cognitive Summary

Orientation Total Score - Q5	/5
Immediate Memory Total Score (all 3 trials) **- Q6**	/15
Concentration Total Score (Sections A and B) **- Q15**	/5
Delayed Recall Total Score - Q16	/5
COGNITIVE RESULTS ≤ 25 is abnormal	/30

NEUROLOGICAL RESULTS (Q 7-14) ☐ Abnormal (+) ☐ Normal (-)

SYMPTOM RESULTS (Q 3) ☐ 1 or more symptoms (+) ☐ No symptoms (-)

HISTORY RESULTS (Q 4A-4C) ☐ Positive (+) ☐ Negative (-)

VOMS RESULTS (Q 17) ☐ Abnormal (+) ☐ Normal (-) ☐ Deferred

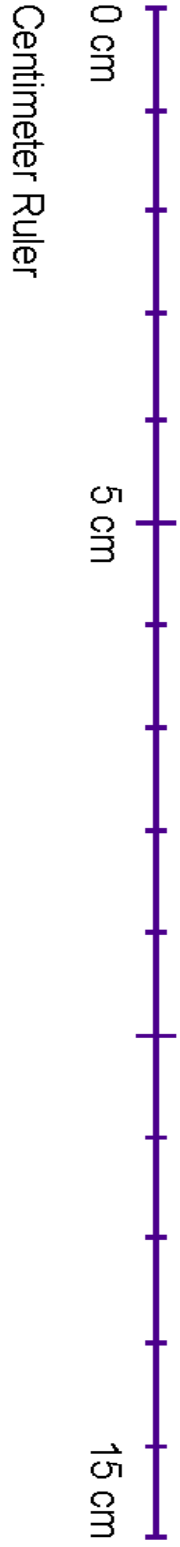
MACE 2 RESULTS ☐ Positive (+) ☐ Negative (-)

AFTER COMPLETING MACE 2:

- ☐ Document MACE 2 results in the EHR with coding instructions.
- ☐ Initiate 24-hour rest.
- ☐ Refer to concussion management tool for the management recommendations based on MACE 2 results.
- ☐ After 24-hour rest period, evaluate for initiation into the Progressive Return to Activity (PRA) following the guidance of the PRA Clinical Recommendation.

  Refer to Progressive Return to Activity Clinical Tool at dvbic.dcoe.mil/files/resources/2013_PRA_PCM_CST_FINAL.pdf

VOMS Equipment Sample 14 point font: **A**



TBI CODING INSTRUCTIONS

Initial TBI screening code*: Z13.850
TBI coding sequence:

1. **Primary TBI diagnostic code: S06. E L S E****
2. **Primary symptom code,** if applicable: (e.g., H53.2 - diplopia)
3. **Deployment status code,** if applicable:*** (e.g., Z56.82 for deployed or Z91.82 for history of military deployment)
4. **TBI external cause of morbidity code:** (For example, Y36.290A (A- use for initial visit) for war operations involving other explosions and fragments, military personnel, initial encounter)
5. Place of occurrence code, if applicable
6. **Activity code,** if applicable
7. **Personal History of TBI code:** if applicable Z87.820

* MACE 2
** Etiology, Location, Severity, Encounter
*** Deployment code must fall within the first four codes when applicable

For more information, see DVBIC ICD-10 Coding Guidance Tool.

References available at https://dvbic.dcoe.mil/material/military-acute-concussion-evaluation-2-mace-2-reference-list.

We are authorized to collect the information on this form and any supporting documentation, including social security numbers, under the Patient Protection and Affordable Care Act (Public Law No. 111-148), as amended by the Health Care and Education Reconciliation Act of 2010 (Public Law No. 111-152), and the Social Security Act.

THIS TOOL MAY BE COPIED FOR CLINICAL USE.

PUID 4901
Released: February 2012 | Revised October 2018
by Defense and Veterans Brain Injury Center.
This product is reviewed annually and is current until superseded.

NEUROGENIC / SPINAL SHOCK PROTOCOL

SPECIAL CONSIDERATIONS:

1. Neurogenic shock refers to the triad of hypotension, bradycardia, and peripheral vasodilation resulting from severe autonomic dysfunction and the interruption of sympathetic nervous system control in acute spinal cord injury. Hypothermia is also characteristic.
2. Neurogenic shock should be considered a diagnosis of exclusion in the setting of trauma.
3. Decreased vascular resistance with resultant warm extremities (depending on surrounding air temperatures) as opposed to cool extremities with hemorrhagic/hypovolemic shock.
4. Neurogenic shock typically occurs with spinal cord injuries at or above T6.
5. Neurogenic shock needs to be differentiated from hemorrhagic/hypovolemic and spinal shock.
   a. Hemorrhagic/hypovolemic shock tends to be associated with tachycardia.
   b. Spinal shock is defined as the complete loss of all neurologic function, including reflexes and rectal tone, below a specific level that is associated with autonomic dysfunction. It is a state of transient physiologic (rather than anatomic) reflex depression of cord function below the level of injury with associated loss of all sensorimotor functions. An initial increase in blood pressure due to the release of catecholamines is noted, followed by hypotension. Flaccid paralysis, including of the bowel and bladder, is observed. Sometimes sustained priapism develops. These symptoms tend to last several hours to days until the reflex arcs below the injury level begin to function again.

SIGNS AND SYMPTOMS:

1. Presents after spinal cord injury with either complete or incomplete paralysis
2. Hypotension
3. Bradycardia (as opposed to tachycardia with hypovolemic shock
4. Priapism
5. Altered mental status
6. Oliguria
7. Loss of bowel/bladder control
8. Warm extremities below the point of injury (dependent on environmental air temperature)
9. Hypothermia

MANAGEMENT:

1. Obtain IV/IO access.
2. Stabilize spine as required to prevent neurologic deterioration.
3. Oxygen with pulse oximetry monitoring.
4. If respiratory distress exists due to high cervical spinal cord injury, secure airway (NPA, ETT, surgical airway).
   a. Intubate using in-line stabilization.
   b. Consider surgical cricothyroidotomy (with local lidocaine) for unstable cervical injury.
5. If patient is hypotensive:
   a. Give 1 liter of normal saline or Ringer's lactate IV/IO bolus. Consider additional fluids if still hypotensive to maintain palpable radial pulse or systolic blood pressure > 90mmHg.
   b. Hextend®500mL boluses may be used if crystalloids are unavailable to maintain palpable radial pulse or systolic blood pressure > 90mmHg.
   c. Maximum of 2 liters of IV fluid (or 1 liter of Hextend®).
   d. In cases of suspected neurogenic/spinal shock (without evidence of uncontrolled hemorrhage), if there is no blood pressure increase after 2L of crystalloid or 1L of Hextend®, give epinephrine as directed in #6.
6. Push-dose epinephrine:
   a. **DO NOT GIVE UNDILUTED (1:1,000) EPINEPHRINE INTRAVENOUSLY.**
   b. Take a 10mL syringe and draw up 1mL of 1:1,000 Epinephrine.
   c. Then draw up 9mL of Normal Saline into this syringe.
   d. Waste 9mL of this mixture, then draw up 9mL more of normal saline into the same syringe.
   e. Final concentration is 10mL of 1:100,000 epinephrine, 10mcg/mL.

f. Administer 0.5-2mL (5-20mcg) IV/IO to maintain radial pulse or systolic blood pressure >90mmHg.

7. Skin breakdown begins within 30 minutes in the immobilized, hypotensive patient; therefore frequent turning and padding of bony prominences is critical.
8. If available, atropine 0.5-1mg IV/IO push if patient is bradycardic.
   a. Repeat as necessary every 3-5 minutes to maximum dose of 3mg.
   b. Atropine doses < 0.5mg may cause a paradoxical bradycardia.
9. Manage hypothermia.

DISPOSITION:

1. *Urgent* evacuation.
2. Maintain spine stabilization throughout transport.

PROCEDURAL ANALGESIA PROTOCOL

SPECIAL CONSIDERATIONS:

1. Intended for performing brief, significantly painful procedures such as chest tube insertion or fracture reduction.
2. Prior to initiating this protocol, the following should be accomplished:
   a. Vascular access.
   b. Airway equipment, suction, and bag valve mask device immediately available and with reach.
   c. Monitoring equipment (if available) on and attached to patient (if tactically feasible).
3.

Concomitant administration of narcotics and benzodiazepines increases the risk for respiratory depression and hemodynamic instability. Use caution. Do not use in patients with shock or hypotension.
4. Once the protocol has been initiated, monitor patient vigorously.

SINGLE AGENT

1. Morphine 5mg IV/IO every 5 min to a maximum total dose of 30mg. Repeat every 30-60 minutes as necessary.
2. In the event of respiratory depression, administer naloxone (Narcan®) in 0.1mg IV/IO increments until respiratory effort is adequate.

DUAL AGENT

1. Midazolam 2mg IV/IO over 1 minute, followed by 0.5-1mg increments after 5 minutes to a maximum total dose of 4mg.
2. **PLUS** ketamine (Ketalar®) 20mg IV/IO over 1 minute, followed by 20mg increments every 30-60 seconds until nystagmus occurs or a maximum total dose of 100mg.

DISPOSITION:
Determine disposition based on the underlying etiology that necessitated the procedure performed.

2017 USSOCOM Tactical Trauma Protocols

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U.S. SPECIAL OPERATIONS COMMAND

TACTICAL MEDICAL EMERGENCY PROTOCOLS (TMEP)

For SPECIAL OPERATIONS ADVANCED TACTICAL PARAMEDICS (SO-ATPs)

APRIL 2019

USSOCOM OFFICE OF THE COMMAND SURGEON
DEPARTMENT OF EMERGENCY MEDICAL SERVICES AND PUBLIC HEALTH
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PREFACE

Management of medical emergencies is best accomplished by appropriately trained physicians in an Emergency Department setting. However, Special Operations Combat Medics (SOCMs) may often find themselves in austere tactical environments where evacuation of a teammate to an MTF for a medical emergency would entail either significant delays to treatment or compromise the unit's mission. Although SOCM trained medics are not routinely authorized by the services to treat non-traumatic emergencies, in many SOF situations, training SOCMs to treat at least some medical emergencies may result in both improved outcome for the individual and an improved probability of mission success. The disorders chosen have one of the following properties in common: they are relatively common; they are acute in onset; the SOCM is able to provide at least initial therapy that may favorably alter the eventual outcome; and the condition is either life-threatening or could adversely affect the mission readiness of the SOF operator.

The Protocols outlined in the following pages carry the following assumptions:

1. The SOCM medic is in an austere environment where a medical treatment facility or a unit sick call capability is not available. If a medical treatment facility or a medic authorized to treat patients independently is available, then the patient should be seen in those settings rather than by a SOCM medic.
2. Immediate evacuation may not be possible and, even if it is, may still entail significant delays to definitive treatment. The medical problem may worsen significantly if treatment is delayed.
3. The SOCM will contact a consulting physician as soon as feasible.
4. SOCM treatment will be done under the appropriate Protocol.
5. Medication regimens are designed to minimize the number of medications the SOCMs are required to learn and carry. Medications have been used for multiple conditions when feasible without compromising care.
6. Appropriate documentation of diagnosis and treatment rendered in the patient's medical record will be accomplished when the unit returns to forward operating base.
7. Note these Protocols are not designed to allow SOCM medics to conduct Medical/ Civic Action (MEDCAP) missions independently.
8. Evacuation recommendations are based on the appropriate therapy per Protocol being initiated on diagnosis.
9. The definitions of Urgent, Priority, and Routine evacuations are based on the times found in Joint Publication (FM) 4-02.2 of 2, 4, and 24 hours respectively.
10. For any infection, limit contact and use universal precautions.

Changes for 2007:

1. The changes in the combat pill pack (moxifloxacin (Avelox®) and meloxicam (Mobic®), as recommended by the Committee on Tactical Combat Casualty Care (CoTCCC), have been changed in the TMEP Protocols. (2007)
2. The fentanyl oral dosage of 800mcg, as recommended by the CoTCCC has been incorporated into the Pain Protocol. (2007)
3. The change in the IV antibiotics has also been changed to reflect medication availability.
4. When possible, alternate antibiotics or anti-emetics have been listed.

Changes for 2008:

1. The Cellulitis and Cutaneous Abscess Protocols were combined.
2. An Altitude Illness Protocol was created, combining AMS, HACE, and HAPE.
3. The Chest Pain was expanded to provide more guidance.
4. The following new protocols were added: Determination of Death and Envenomation.
5. The following medication changes were made: the use of azithromycin (Zithromax®) was decreased; cefalexin (Keflex®), quinine, doxycycline, and corticosporin otic were removed.
6. The following medications were added: amoxicillin/clavulanic acid (Augmentin®), rabeprazole (Aciphex®), trimethoprim and sulfamethoxazole (Septra®) DS, salmeterol (Serevent®), Rifampin (Rifadin®), ketolorac (Toradol®), and diphenhydramine (Benadryl®) quick dissolve strips.
7. The Meningitis Disposition typo error from 2007 was corrected.
8. Modifications were made to most of the TMEPS with respect to further refinement in recommendations.
9. The "Clinical Pearls" section was added.

Changes for 2009:
1. Crush Protocol added
2. Blast Protocol added
3. MACE charts added
4. Traumatic Brain Injury - Mild (mTBI) Protocol added
5. Bronchitis/Pneumonia: Disposition changed
6. Flank Pain: antibiotics modified (order of preference)
7. Joint Infection: antibiotics modified (order of preference)
8. Spontaneous Pneumothorax: indications for tube thoracostomy added
9. Urinary Tract Infections: antibiotics modified
10. Drugs added: calcium chloride, calcium gluconate, sodium bicarbonate, mannitol (Osmitrol®)
11. HIV PEP Protocol updated with new medications added: Atripla®, Truvada®, Viread®, Kaletra®
12. Behavioral Changes Protocol changed and midazolam added
13. Seizure Protocol changed and midazolam added

Changes for 2010:
1. K-9 Protocols added
2. Drugs added: tadalafi (Cialis®), sildenafil (Viagra®)
3. Altitude Illness changed to add tadalafi (Cialis®) and sildenafil (Viagra®)

Changes for 2011:
1. Trauma Protocols added
2. TMEP Seizure Protocol updated to match Trauma Seizure Protocol
3. Drugs added: fosphenytoin (Cerebyx®), tranexamic acid (TXA) (Cyklokapron®)
4. Blast TMEP deleted and recommendations incorporated into the Tactical Trauma Protocols
5. Crush Syndrome TMEP moved to Tactical Trauma Protocols
6. Rewrite of majority of Tactical Medical Emergency Protocols
7. Expansion of Envenomation Protocols
8. Revision of Cold Injury Protocol
9. Revision of Heat Illness Protocol
10. Revision of K-9 Protocol
11. Administration of Blood Products Protocol added to Tactical Trauma Protocols
12. Neurogenic/Spinal Shock Protocol added to Tactical Trauma Protocols
13. IV push dose epinephrine authorized for Neurogenic/Spinal Shock Protocol and Septic Shock Protocol

Changes for 2013:
1. Added e-mail address for suggested changes.
2. Added Abdominal Aortic & Junctional Tourniquet - AAJT™ and SAM® Junctional Tourniquet
3. Added additional characteristic recommendation for supraglottic airways.
4. Revised the Administration of Blood and Blood Components Protocol to allow for routine transfusion of low titer Type O whole blood as a functional “universal donor” and untitered Type O Fresh Whole Blood *in extremis.*
5. Removed recommendation with Epinephrine and/or Diphenhydramine from the Administration of Blood and Blood Components Protocol.
6. Added Albuterol to the Crush Syndrome Protocol and changed order of preference for drugs to increase calcium.
7. Added example crush syndrome treatment kit.
8. Changed photos in the canine protocols and revised wording.
9. Revised antibiotic recommendations and advised to remove contacts in the Corneal Abrasion Protocol.
10. Added Open Globe Injury Protocol.

Changes for 2016/2017:
1. Removed acetaminophen for injection (Ofirmev®) to keep the overall drug list shorter and because it was unwieldy.
2. Added K-9 Anaphylactic Reactions And Envenomation Protocol
3. Added K-9 Gastric Dilatation Volvulus (GDV) / Bloat Protocol

4. Modified guidance for use of LR in the Crush Injury Protocol
5. Added ketamine for chemical restraint of a combative patient to the Behavioral Changes Protocol
6. Removed diphenhydramine (Benadryl®) quick dissolve strips from clinical pearls list of available SL medications due to discontinuation
7. Updated COLD INJURY PROTOCOL to ensure adherence to the 2014 Alaska state guidelines and added more detailed guidance for hypothermia management.
8. Added CBRN: NERVE AGENT POISONING PROTOCOL
9. Changed SMOKE INHALATION PROTOCOL to SMOKE INHALATION/CHOKING AGENT/TICS PROTOCOL.
10. Added CBRN treatments to the ASTHMA (REACTIVE AIRWAY DISEASE) PROTOCOL, SMOKE INHALATION/CHOKING AGENT/TICs PROTOCOL and CORNEAL ABRASIONS/ CORNEAL ULCERS/ CONJUNCTIVITIS PROTOCOLS.
11. Updated the PAIN MANAGEMENT PROTOCOL with ketamine (Ketalar®) and other minor changes in order to reflect the pain management guidelines in the USSOCM Tactical Trauma Protocol more closely
12. Added a Disposition to all of the K-9 Protocols
13. Removed doxycycline (Vibra-Tabs®) from the TESTICULAR TORSION PROTOCOL and replaced with azithromycin (Zithromax®) for presumptive treatment of STD
14. Removed warning in the CRUSH SYNDROME and RHABDOMYOLYSIS PROTOCOLS stating “Ringer’s lactate is not recommended due to the potassium content, but may be used if nothing else is available”.
15. Removed “If crystalloids (normal saline or lactated Ringer’s) are recommended, but not available, substitute Hextend® or Hespan® if available” from Clinical Pearls.
16. Adjusted the dosage and units of measure for fosphentoin (Cerebyx®) in the SEIZURES PROTOCOL
17. Modified PAIN MANAGEMENT PROTOCOL to match the USSOOCM Tactical Trauma Protocols
18. Corrected various misspellings and grammatical and formatting errors.
19. Modified the CONSTIPATION/ FECAL IMPACTION PROTOCOL

Don't Forget…
(Clinical Pearls)

When IV route is recommended, but not obtainable, consider IO, IM, PO, or PR unless contraindicated.

Currently available SL medication formulations include: Phenylephrine (Sudafed PE®) orally disintegrating strips, and Ondansetron (Zofran®) orally disintegrating tablet.

DO NOT give Epinephrine IV **unless given under the ACLS protocols or the Neurogenic/Spinal Shock Protocol**

All IV medications may be given slow IV push with the exception of antibiotics, which should be in a drip, unless otherwise specified.

Remember to document dose and time of all medications so the receiving facility may be informed.

Do not use local anesthetic with epinephrine on the ears, nose, digits, or penis.

When oxygen is called for in the protocols, the authors realize that it is recommended, but may not be available.

Due to the high level of physical fitness of SOF personnel, there may be a prolonged period of mental lucidity and apparent stable vital signs despite a severe injury. Treat the injury, not the Operator!

Medical Documentation (SOAP note): In order to ensure proper care and medical information transfer during patient treatment a standardize format for medical documentation is required. The standard format is the SOAP note (Subjective, Objective, Assessment, and Plan).

Subjective: In the patient's own words, describe the chief complaint. At a minimum you need to include the OPQRST (**O**nset, **P**alliative or **P**rovocative, **Q**uality, **R**adiation, **S**everity, and **T**imeline of symptoms). AMPLE (**A**llergies, **M**edication, **P**ast medical and surgical history, **L**ast meal, and **E**vents leading up to this condition) history is also included in this section

Objective: vital signs and physical examination findings. At a minimum you need to document pertinent positives and negatives, and measurements of injuries or lesions. Be as detailed as possible.

Assessment: a brief summary of your medical decision making to include what you think it is and what it is not. Include your differential diagnosis list in this section.

Plan: your course of treatment to include any medications, additional studies, consultation, rehabilitation, evacuation category and disposition of the patient.

ABDOMINAL PAIN PROTOCOL

SPECIAL CONSIDERATIONS:
1. Common causes in young healthy adults include appendicitis, cholecystitis, pancreatitis, perforated ulcer, and diverticulitis.
2. Consider constipation/ fecal impaction as a potential cause of abdominal pain.
3. Consider bowel perforation if abdominal pain begins within 72 hours of a blast injury.

SIGNS AND SYMPTOMS SUGGESTIVE FOR URGENT EVACUATION:
1. Severe, persistent or worsening abdominal pain is the key sign
2. Rigid abdomen
3. Rebound abdominal tenderness
4. Fever
5. Absence of bowel sounds
6. Focal percussive tenderness
7. Uncontrollable vomiting
8. Presence of bloody vomitus or stools
9. Presence of black tarry stools
10. Presence of coffee ground vomitus

MANAGEMENT:
1. Start IV with normal saline (NS), 1 liter bolus, followed by NS 150mL/hr. Keep NPO except for medications or PO hydration.
2. Ertapenem (Invanz®) 1gm IV qd
3. **OR** ceftriaxone (Rocephin®) 1gm IV qd. plus metronidazole (Flagyl®) 500mg PO q 8hr
4. Treat per ***Pain Management Protocol (TMEP)*** (***DO NOT USE NSAIDS)***
5. Treat per ***Nausea and Vomiting Protocol (TMEP)***

DISPOSITION: *Urgent* evacuation to a surgical facility.

SIGNS AND SYMPTOMS SUGGESTIVE FOR CONTINUED OBSERVATION:
1. Epigastric burning pain
2. Present bowel sounds
3. Nausea and/ or vomiting
4. Absence of rebound tenderness
5. If diarrhea is present, treat per ***Gastroenteritis Protocol (TMEP)***

MANAGEMENT:
1. Antacid of choice
2. Ranitidine (Zantac®) 150mg PO bid **OR** rabeprazole (Aciphex®) 20mg PO qd
3. PO hydration

DISPOSITION:
1. Observation and re-evaluation.
2. *Priority* evacuation if symptoms not controlled by this management within 12 hours.

ALLERGIC RHINITIS/ HAY FEVER/ COLD-LIKE SYMPTOMS PROTOCOL

SPECIAL CONSIDERATIONS:
History of allergies to cedar, mold, pollen, etc.

SIGNS AND SYMPTOMS:
1. Clear nasal drainage
2. Pale, boggy or inflamed nasal mucosa
3. With or without complaints of nasal congestion
4. Watery or red eyes
5. Sneezing
6. Normal temperature

MANAGEMENT:
1. Pseudoephedrine (Sudafed®) 60mg PO q 4-6hr.
2. Diphenhydramine (Benadryl®) 25-50mg PO q 6hr if tactically feasible. (Drowsiness is a side-effect.)
3. Increase oral fluid intake.

DISPOSITION:
None applicable

ALTITUDE ILLNESS PROTOCOL

SPECIAL CONSIDERATIONS:

ACUTE MOUNTAIN SICKNESS (AMS)

1. Usually occurs at altitudes of 8,000ft and higher.
2. Consider pretreatment when rapid ascent to altitudes above 8,000ft may occur:
   a. Acetazolamide (Diamox®) 125mg bid started 24 hours before ascent
   b. Dexamethasone (Decadron®) 4mg PO bid started 24 hours before ascent for patients allergic to sulfa drugs
3. Consider pretreatment if rapid ascent above 11,500ft occurs (as with airlifts):
   a. Dexamethasone (Decadron®) 4mg PO q 6hr within 24 hours of ascent
   b. **PLUS** acetazolamide (Diamox®) 125mg PO bid (if not allergic to sulfa)
4. Symptoms may occur as quickly as 3 hours after ascent.
5. Can avoid onset by limiting initial ascent to no higher than 8,000ft then 1,000ft. per day thereafter. The key to prevention is slow, gradual ascent.

HIGH ALTITUDE CEREBRAL EDEMA (HACE)

1. Rare below 11,500ft.
2. Headache is common at altitude. Ataxia and altered mental status at altitude are HACE until proven otherwise.

HIGH ALTITUDE PULMONARY EDEMA (HAPE)

1. Caused by the hypoxia of altitude, HAPE is the most common cause of death from altitude illness.
2. Usually occurs above 8,000ft. Respiratory distress at high altitude is HAPE until proven otherwise.
3. Nifedipine (Procardia®) is recommended as prophylaxis in personnel who have a history of previous HAPE and are required to operate at altitude. Acetazolamide (Diamox®), sildenafil (Viagra®), tadalafil (Cialis®), dexamethasone (Decadron®), salmeterol (Serevent®), and albuterol (Proventil®) may be considered if nifedipine (Procardia®) is not available.

HACE AND HAPE MAY COEXIST IN THE SAME PATIENT!

SIGNS AND SYMPTOMS:

1. AMS is generally benign and self-limiting, but symptoms may become debilitating. Worsening condition should prompt consideration of a more life-threatening condition (HAPE or HACE).
   a. AMS: Diagnosis is made in presence of headache **AND** one or more of the following: anorexia, nausea, vomiting, insomnia, dizziness, lassitude, or fatigue
   b. No correlation with fitness level (likely genetic predisposition)
2. HACE: Unsteady, wide, and unbalanced (ataxic) gait and altered mental status are hallmark signs.
3. HAPE: Dyspnea at rest is the hallmark signs. Other symptoms may include cough, crackles upon auscultation, tachypnea, tachycardia, fever, central cyanosis, or low oxygen saturation disproportionate to the elevation level.

MANAGEMENT:

1. Halt ascent. Immediately descend at least 3,000ft for HACE, HAPE, or refractory AMS if tactically feasible.
2. **IF AMS SYMPTOMS PRESENT**
   a. Acetazolamide (Diamox®) 250mg PO bid **UNLESS PATIENT IS ALLERGIC TO SULFA**
   b. Dexamethasone (Decadron®) 4mg PO q 6hr if patient is allergic to sulfa

If Dexamethasone (Decadron®) is administered, no further ascent until asymptomatic for 24 hours after last Dexamethasone (Decadron®) dose.

3. **IF HACE SYMPTOMS PRESENT: ATAXIA OR ALTERED MENTAL STATUS**
   a. Administer supplemental oxygen to bring SaO_2 above 90% (if available)
   b. Dexamethasone (Decadron®) 8mg IV/ IM STAT, then 4mg IV / IM q 6hr

Individuals with HACE should not be left alone and especially not be allowed to descend alone.

4. **IF HAPE SYMPTOMS PRESENT: SHORTNESS OF BREATH AT REST**
   a. Administer supplemental oxygen to bring SaO_2 above 90% (if available)
   b. Nifedipine (Procardia®) 30mg SR q 12hr or 20mg SR q 8hr if blood pressure is stable
      i. **IF NIFEDIPINE IS NOT AVAILABLE:** sildenafil (Viagra®) 50mg q 8hr, or tadalifil (Cialis®) 10mg q 12hr
      ii. Do not use nifedipine (Procardia®) in HACE; the drop in blood pressure may worsen the symptoms of this condition.
   c. Considers salmeterol (Serevent®) 2 inhalations q 12hr or albuterol (Ventolin®) 2 inhalations q 6hr as an adjunct treatment.

Minimize patient exertion during descent for HAPE since this will exacerbate symptoms.

5. Treat per ***Pain Management Protocol (TMEP)***, but avoid the use of narcotics since they may depress respiratory drive and worsen high altitude illness.
6. Treat per ***Nausea and Vomiting Protocol (TMEP)***.
7. For signs or symptoms of either HAPE or HACE: If immediate descent is not tactically feasible and a Gamow bag is available, use a Gamow bag in 1 hour treatment sessions with bag inflated to a pressure of 2psi (approximately 100mmHg) above ambient pressure. Four or five sessions are typical for effective treatment. GAMOW BAG TREATMENT IS **NOT A SUBSTITUTE FOR DESCENT.**
8. Treat per ***Dehydration Protocol (TMEP)***.

DISPOSITION:
1. Most cases of AMS are relatively mild, resolve in 2-3 days, and do not require evacuation.
2. Avoid vigorous activity for 3-5 days.
3. *Priority* evacuation for AMS patients that worsen despite therapy.
4. *Urgent* evacuation for patients with suspected HACE or HAPE.
5. Individuals who have recovered from HACE or HAPE should not re-ascend without medical officer clearance.

ANAPHYLACTIC REACTION PROTOCOL

SPECIAL CONSIDERATIONS:

1. Acute, widely distributed form of shock which occurs within minutes of exposure to an allergen.
2. Primary causes include insect envenomation, medications, and food allergies.
3. Death can result from airway compromise, inability to ventilate, or cardiovascular collapse.
4. The Medic's responsibility is to know if members in the unit have such a condition. Moreover, the Medic must also ensure that the member has some sort of anaphylaxis kit and is trained to use it.
5. Consider localized allergic reaction. Anaphylaxis is a life-threatening emergency.

SIGNS AND SYMPTOMS:

1. Wheezing (bronchospasm)
2. Dyspnea
3. Stridor (laryngeal edema)
4. Angioedema
5. Urticaria (Hives)
6. Hypotension
7. Tachycardia

MANAGEMENT:

For Patients with Signs and Symptoms of Airway involvement and/ or Circulatory Collapse:

1. Epinephrine is the mainstay of therapy.
   a. Administer EpiPen®
   b. **OR** epinephrine 0.5mg (0.5mL of 1:1000 IM). **DO NOT USE INTRAVENOUSLY**
   c. Repeat epinephrine q 5 minutes prn
2. Oxygen with pulse oximetry monitoring
3. If severe respiratory distress exists, aggressive airway management with bag-valve-mask and airway adjuncts (oral and nasopharyngeal airways). Intubate early if no response to epinephrine.
4. IV normal saline TKO (saline lock).
   a. Administer 1-2 liters normal saline bolus for hypotension;
   b. Titrate to establish systolic blood pressure > 90mmHg or palpable radial pulse if BP cuff not available.
5. Diphenhydramine (Benadryl®) 50mg IV / IM / PO / SL.
6. Dexamethasone (Decadron®) 10mg IV/ IM / PO.
7. If wheezing is present after epinephrine administration, consider albuterol (Ventolin®), 2-3 puffs q 5 minutes, repeat up to 3 times. The metered dose inhaler works best when used with a spacer (e.g., rolled up piece of paper, cardboard from toilet paper roll, etc).
8. Ranitidine (Zantac®) 150mg PO bid.

DISPOSITION:

Urgent evacuation.

ASTHMA (REACTIVE AIRWAY DISEASE) PROTOCOL

SPECIAL CONSIDERATIONS:

1. Other disorders to consider: anaphylactic reaction, spontaneous pneumothorax, HAPE, and pulmonary embolism.
2. Exposure to nerve agents, vesicants, and Toxic Industrial Chemicals (TICs) can cause Reactive Airway disease (RAD) (bronchoconstriction).

SIGNS AND SYMPTOMS:

1. Wheezing
2. Dyspnea
3. Difficulty with speaking in full sentences.

MANAGEMENT:

1. Albuterol (Ventolin®) (metered dose inhaler - works best when used with spacer), 2-3 puffs q 5 min, repeat up to 3 times.
2. If there is no response to Albuterol (Ventolin®)**,** Epinephrine 0.5mg (0.5mL of 1:1000 solution) IM **(DO NOT INJECT INTRAVENOUSLY)**. May repeat one dose in 5-10 min.
3. Oxygen with pulse oximetry monitoring.
4. IV access with saline lock.
5. Dexamethasone (Decadron®) 10mg IV / IM / PO.
6. If there is fever, pleuritic chest pain and productive cough, treat per ***Bronchitis/Pneumonia Protocol (TMEP)***.
7. If bronchospasm due to nerve agent, primary treatment should be with atropine to reverse bronchospasm and bronchorrhea. Atropine should be given in 2-4mg doses until airway distress resolves. See ***CBRN: Nerve Agent Poisoning Protocol (TMEP)***.

DISPOSITION:

1. *Urgent* evacuation if no response to treatment.
2. If the patient responds to management, observe for 4 hours.
   a. Return to Duty if there is no wheezing or dyspnea and normal oxygen saturation. Continue albuterol (Ventolin®) (2 puffs q 6hr) and re-evaluate in 24 hours. Continue dexamethasone (Decadron®) 10mg IM qd for 4 days.
   b. *Urgent* evacuation if symptoms persist.

BACK PAIN PROTOCOL

SPECIAL CONSIDERATIONS:
Motor weakness, saddle anesthesia, sensory loss, loss of bowel or bladder control in the setting of back pain is a neurological emergency requiring *Urgent* evacuation.

SIGNS AND SYMPTOMS:
1. Pain may worsen with movement.
2. Pain may radiate into legs.

MANAGEMENT:
1. Treat per ***Pain Management Protocol (TMEP)***.
2. Apply cold compress to painful area for 20-25 min tid.
3. Trigger point injections with local anesthetic (**IF TRAINED**). Lidocaine 1-2mL per trigger point. May repeat qd for 2 days.
4. Consider diazepam (Valium®) 5-10mg IM / IV / PO. Repeat once in 6-8hr prn.
5. Minimize activity initially, but encourage gradual stretching and return to full mobility as soon as tolerated.
6. If back pain is accompanied by fever and / or urinary symptoms, treat per ***Flank Pain Protocol (TMEP)***.

DISPOSITION:
1. Evacuation is often not required if the back pain responds to therapy.
2. *Routine* evacuation for severe cases not responding to therapy.
3. *Urgent* evacuation for patients with neurological involvement (other than pain) such as:
   a. Weakness
   b. Bowel or bladder dysfunction
   c. Saddle anesthesia

BAROTRAUMA PROTOCOL

SPECIAL CONSIDERATIONS:

1. Pulmonary Over-Inflation Syndrome (POIS) may occur from ascent from depth if compressed air was used or exposure to blast overpressure.
2. The most commonly affected site is the middle ear and tympanic membrane, but paranasal sinuses and teeth may be affected.
3. Pulmonary barotrauma occurs when compressed air is breathed at depth followed by ascending with a closed airway (i.e. breath-holding), and can cause pneumothorax or arterial gas embolism.

SIGNS AND SYMPTOMS:

1. Pain in the ear(s), sinuses, teeth.
2. Pulmonary over-inflation syndrome (POIS) may present with chest pain, dyspnea, mediastinal emphysema, subcutaneous emphysema, pneumothorax or AGE.
   a. Arterial gas embolism (AGE) - unconsciousness, paralysis, weakness, fatigue, large areas of abnormal sensations, convulsions. Symptoms usually occur within 10 minutes of surfacing after a dive or shortly after overpressure exposure (blast injury).
   b. In all cases of AGE associated pneumothorax it is possible and should not be overlooked.

MANAGEMENT:

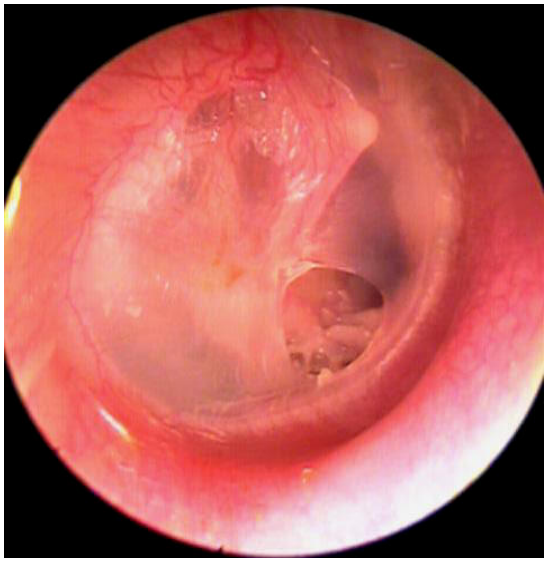
1. If flying, descend to altitude until relief is felt (if feasible).
2. Middle ear
   a. If a tympanic membrane rupture is present or suspected, protect the ear from water or further trauma.
   b. Moxifloxacin (Avelox®) 400mg PO qd if contamination is suspected.
   c. Pseudoephedrine (Sudafed®) 60mg PO q 4-6hr prn
   d. **DO NOT** use ear drops. If TM is not ruptured, use oxymetazoline (Afrin®) nasal spray.
   e. Refer to higher level of care when feasible
3. Paranasal Sinus barotraumas pseudoephedrine (Sudafed®) 60mg PO q 4-6hr prn
4. Pulmonary barotraumas (to include subcutaneous emphysema):
   a. If no respiratory distress, monitor patient closely. Use pulse oximetry if available
   b. If respiratory distress occurs - Treat per ***Pneumothorax, Acute (Atraumatic) Protocol (TMEP)***
5. If Pulmonary Over Inflation Syndrome (POIS) is suspected, administer 100% oxygen and 1 liter normal saline IV 150cc/hr. *Urgent* evacuation to recompression chamber.
6. If an unpressurized airframe is used, avoid altitude exposure greater than 1000ft.
7. Treat per ***Pain Management Protocol (TMEP)***. (Avoid narcotics if recompression is anticipated.)

DISPOSITION:

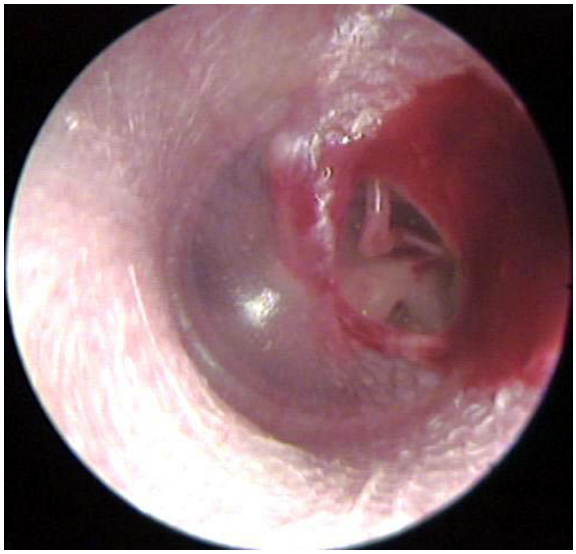
1. *Urgent* Evacuation for cerebral arterial gas embolus, POIS or pneumothorax with respiratory distress,
2. Mild to moderate middle ear, sinus, or pulmonary barotraumas without respiratory distress, observation and *Routine* evacuation.
3. *Routine* evacuation for consultation for Tympanic Membrane rupture.

NORMAL TYMPANIC MEMBRANE

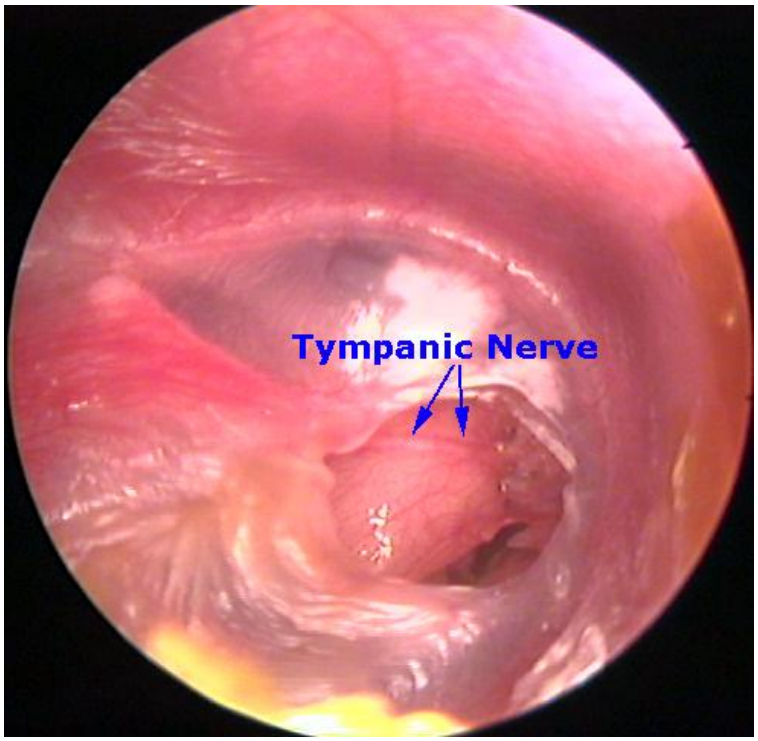
PERFORATED TYMPANIC MEMBRANE



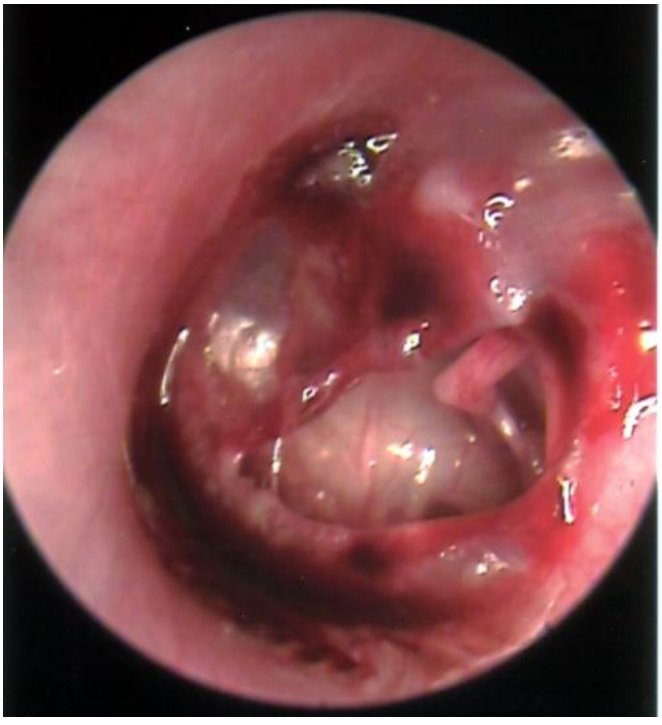
TRAUMATIC PERFORATED TYMPANIC MEMBRANE



PERFORATED TYMPANIC MEMBRANE EXPOSING TYMPANIC NERVE



TRAUMATIC PERFORATION OF TYMPANIC MEMBRANE



BEHAVIORAL CHANGES PROTOCOL
(INCLUDES PSYCHOSIS, DEPRESSION AND SUICIDAL IMPULSES)

SPECIAL CONSIDERATIONS:

1. In a tactical setting consider sleep deprivation as a cause.
2. Etiologies are numerous and will often dictate the management; thus mental status changes could be caused by head trauma, metabolic and endocrine disease processes, environmental toxins, infections, combat stress disorder, hypoxia, hyperthermia, hypothermia, pharmaceutical agent use (e.g., mefloquine (Lariam®)) or withdrawal.
3. Consider diabetic hypoglycemia as a cause of altered mental status.

SIGNS AND SYMPTOMS:

1. Acute behavioral changes include withdrawal, depression, aggression, confusion, or other behavioral patterns atypical for the individual.
2. Psychosis is an acute change in mental status characterized by altered sensory perceptions that are not congruent with reality:
   a. Auditory and/ or visual hallucinations
   b. May include violent or paranoid behavior
   c. Disorganized speech patterns are common
   d. May include severe withdrawal from associates

MANAGEMENT:

1. Remove all weapons or potential weapons from patient AND treating Medic.
2. Check pulse oximetry.
3. Place patient in safe environment under continuous surveillance.
4. Place either 1 tube of oral glucose gel containing 40% dextrose (d-glucose), (Glutose45™) or contents of one packet of sugar in the buccal mucosal region for possible hypoglycemia.
5. Take Temperature
   a. If Temperature is below 95 °F (35 °C), treat per ***Cold Injury Protocol (TMEP)***
   b. If Temperature is above 101 °F (38.3 °C), treat per ***Meningitis Protocol (TMEP)***
   c. If Temperature is above 103 °F (39.4 °C), treat per ***Meningitis Protocol (TMEP)*** *and the* ***Heat Illness Protocol (TMEP)***
   d.

IF MENINGITIS IS SUSPECTED OR IF THERE IS A DECREASE IN MENTAL STATUS, USE VALIUM WITH CAUTION, DUE TO POSSIBLE RESPIRATORY DEPRESSION, HYPOTENSION, AND MASKING OF PROGRESSION OF DISEASE RELATED ALTERED MENTAL STATUS.
6. For acute agitation, combativeness, or violent behavior, restrain patient with at least four individuals and give ketamine (Ketalar®) 4-5mg per kg for a max dose of 500mg IM.
7. Apply physical restraints once patient is chemically restrained with ketamine, then establish IV access. If emergence reaction occurs in the form of combativeness, give midazolam 1-2mg IV **OR** diazepam (Valium®) 2mg IV. Repeat after 3-5 minutes prn for a max dose of 4mg of midazolam or 5mg of diazepam (Valium®).
8.

If sedated or restrained, maintain constant vigilance for a change in the hemodynamic status or loss of airway reflexes.

DISPOSITION:

Urgent Evacuation

USSOCOM Counseling Risk Reduction Tool

INSTRUCTIONS FOR LEADERS

This tool is designed to help leaders identify potential risks among their service members (SM). If an SM has a concern or problem, provide him/her with options (suggestions are provided under "Leader Action" for each issue of concern), ensure that you follow up with him/her, and continue to address the plan of action as necessary. Document any pertinent issues of concern and the associated action plan on applicable counseling forms.

#	Issue of Concern	Leader Actions
1.	Has the SM been command referred for any assistance (e.g., legal, financial, spiritual, alcohol, family/relationship, behavioral, health, other)? Does the Subordinate wish to disclose receiving any assistance for which he/she was not command referred?	Refer SM to appropriate resources. Reserve Component (RC) ensure referral is with appropriate local resource.
2.	Is the SM experiencing any difficulties getting the assistance he/she needs either on-post or off-post?	Refer SM to appropriate resources. RC ensure referral is with appropriate local resource. Flow-up w/SM within 14 days to ensure that any difficulties have been overcome or resolved.
3.	Has the SM been unsuccessful in meeting requirements or standards (e.g., duty performance, PT, Battle Assembly participation (RC only), weight control, weapons qualification, MOS training)?	Develop and implement a plan of action to meet the requirements/ standards. Closely monitor the SM's progress.
4.	Has the SM received negative counseling or evaluations since arriving at the current unit or organization?	Determine if this is a current condition. Develop and implement a plan of action to meet the requirements/standards. Closely monitor the SM's progress.
5.	Has the SM been denied promotion or attendance to schools, or barred from reenlistment for any reason?	Determine if this is a current condition. Develop and implement a plan of action to meet the requirements/standards. Closely monitor the SM's progress.
6.	Is the SM currently undergoing a UCMJ action?	Ensure Subordinate has adequate support, to include legal.
7.	Does the SM have financial or employment concerns, such as inability to cover basic monthly expenses, home foreclosure, difficulty meeting child support payments, or inability to repay loans?	Refer SM to unit or installation financial representative or Community Service Financial Readiness Program. RC ensure referral is with appropriate local resource.
8.	Has the SM experienced an accident, injury, illness, or medical condition that resulted in current fitness for duty limitations?	Ensure SM has appropriate medical follow-up. Ensure medical profile in e-Profile.
9.	Does the SM have a current medical profile (temporary or permanent)?	Ensure SM has appropriate medical follow-up. Ensure medical profile in e-Profile.
10.	Does the SM have any concerns about medical care, medications or supplement he/she is taking?	Refer to Primary Care Manager (PCM) or Military Treatment Facility (MTF). RC ensure referral is with appropriate local resource.
11.	Is the SM currently experiencing problems related to sleep (e.g., trouble falling asleep, trouble staying asleep, performance problems related to sleep, consistently getting less than 7-9 hours of sleep, using alcohol or other substances to get to sleep)?	Refer to PCM or MTF. RC ensure referral is with appropriate local resource.
12.	Does the SM tend to withdraw or socially isolate himself/ herself from others?	Refer to Unit Ministry Team (UMT), PCM, MTF, or Unit Behavioral Health Team, as appropriate. RC ensure referral is with appropriate local resource.
13.	Has the SM exhibited excessive anger or aggression in the past three months?	Refer to UMT, PCM, MTF, or Unit Behavioral Health Team, Anger Management, or other appropriate support. RC ensure referral is with appropriate local resource.
14.	Is the SM experiencing serious marital/relationship issues, or immediate family concerns, such as a serious illness in a family member?	Refer to Community Services, Military Family Life Counselor (MFLC), Military OneSource, UMT, Unit Behavioral Health Team, or other appropriate support. RC ensure referral is with appropriate local resource.
15.	Has the SM been involved in any accidents of domestic violence or child abuse/neglect?	Refer to Family Advocacy Program. RC ensure referral is with appropriate local resource.

COUNSELING AREAS AND LEADER ACTIONS (Cont.)

16.	Has the SM experienced any condition that may be considered cruel, abusive, oppressive, or harmful, to include hazing or assault?	Connect Subordinate with appropriate support (e.g., SHARP, EO, Family Advocacy, UMT, PCM, MTF). RC ensure referral is with appropriate local resource.
17.	Has the SM experienced any condition that may be considered cruel, abusive, oppressive, or harmful, to include hazing or assault?	Refer to unit Substance Abuse Program at time of incident and closely monitor SM'S progress. RC ensure referral is with appropriate service.
18.	Has the SM deployed to a location where there was hostile fire or the received hazardous duty pay?	Does the SM have any current deployment related concerns? Refer to PCM, MTF, or other appropriate support. RC ensure referral is with appropriate service.
19.	Haas the SM experienced difficulty coping with a loss (e.g., death of a close friend, family member or team member, loss of social support)?	Refer to UTM, PCM, MTF, Unit Behavioral Health Team, or other appropriate support. RC ensure referral is with appropriate service.
20.	Has anyone (e.g., spouse, other family member, friends, fellow SM) expressed concern about the SM's behavior?	Obtain additional information as appropriate. Refer to local unit Community Health Services, MFLC, Military OneSource, UMT, Unit Behavioral Health Team, or other appropriate support. RC ensure referral is with appropriate service.
21.	Has the SM expressed any suicidal thoughts or actions, or expressed a desire to harm others?	Escort SM to Installation Behavioral Health or MTF Emergency Room, as appropriate, and notify leadership. Do not leave SM alone, Order SMs who possess privately owned weapons on post to store them in the unit arms room; ask SMs who possess privately owned weapons off post to voluntarily surrender them to the unit arms room. Consider ordering SM to reside in barracks for an evaluation period (3 days) if they choose not to voluntarily surrender weapons stored off post.

BRONCHITIS/ PNEUMONIA PROTOCOL

SPECIAL CONSIDERATIONS:
1. Consider high altitude pulmonary edema (HAPE) at high altitudes.
2. Consider pulmonary embolism (PE) and pneumothorax (fever and productive cough are atypical for these).

SIGNS AND SYMPTOMS:
1. Fever
2. Productive cough, especially with dark yellow, red tinged, or greenish sputum
3. Chest pain
4. Rhonchi may be present and breath sounds may be decreased over the affected lung
5. Dyspnea may be present in severe cases

MANAGEMENT:
1. Azithromycin (Zithromax®) 500mg PO first dose then 250mg qd for 4 days **OR** moxifloxacin (Avelox®) 400mg PO qd for 7 days.
2. If unable to tolerate PO intake, ertapenem (Invanz®) 1gm IV / IM **OR** ceftriaxone (Rocephin®) 1gm IV qd.
3. Albuterol (Ventolin®) by metered dose inhaler 2-4 puffs q 4-6hr.
4. Treat per ***Pain Management Protocol (TMEP)***.
5. If febrile, acetaminophen 1gm PO q 6hr.
6. Pulse oximetry monitoring.
7. Oxygen prn.
8. If at high altitude, see ***Altitude Illness Protocol (TMEP)*** and treat for HAPE.

DISPOSITION:
1. *Urgent* evacuation for severe dyspnea or hypoxia.
2. *Observation or Routine evacuation* as necessary.

CBRN: NERVE AGENT POISONING PROTOCOL

SPECIAL CONSIDERATIONS:

1. Vapor inhalation is typical more severe than liquid cutaneous exposure.
2. Medic must ensure scene safety, if in the area of exposure leave!
3. Remove all patient clothing and decontaminate with a total body soap and water scrub.
4.

Identification of specific agent is unnecessary. DO NOT DELAY THERAPY!!!
5. Atropine treats only muscarinic symptoms. Pralidoxime is needed to treat nicotinic symptoms.
6. Pralidoxime reactivates acetylcholinesterase, however it is only useful if given before agent ages.
7. If agent "ages" on acetylcholinesterase it will be bound permanently.
8. Each nerve agent ages at a different rate (from 2 minutes to days).
9. Common reasons for exposure: insecticides, agricultural professions, and weaponized.

SIGNS AND SYMPTOMS:

1. Muscarinic = **DUMBELS**
   - **D –** Diarrhea
   - **U –** Urination
   - **M –** Miosis (pinpoint pupils)
   - **B –** Bronchospasm, bronchorrhea, bradycardia
   - **E –** Emesis
   - **L –** Lacrimation
   - **S –** Salivation, secretions, sweating
2. Nicotinic = **MTWHF**
   - **M** – Mydriasis (dilated pupils)
   - **T** – Tachycardia
   - **W** –Weakness
   - **H** – Hypertension
   - **F** – Fasiculations (involuntary twitches)

Triage Categories (single/few patients)

Category I
- a. Miosis
- b. Rhinorrhea
- c. Salivation

Category II
- a. Tightness in chest
- b. Dyspnea
- c. Localized or generalized fasciculations

Category III
- a. Life threatening dyspnea
- b. Seizures

Triage Categories (MASCAL)

No Treatment
- a. Miosis
- b. Rhinorrhea
- c. Absence of any other symptoms

Category I
- a. Sweating
- b. Fasiculations
- c. Nausea & vomiting
- d. Weakness
- e. Dyspnea

Category III
- a. Unconsciousness
- b. Convulsions

c. Apnea
d. Flaccid paralysis

MANAGEMENT:

1.

Airway management is paramount!
2.
Antidote Treatment Nerve Agent, Auto-Injector (ATNAA)
   a. Given intramuscularly
   b. Each auto-injector contains Atropine 2.1mg and pralidoxime (2PAM-Cl) 600mg
   c. Number of auto-injectors given depends on symptoms
3.
Convulsant Antidote for Nerve Agent (CANA)
   a. Given intramuscularly
   b. Each auto-injector contains 10mg of diazepam
   c. Number of auto-injectors given depends on symptoms
4. Dosages
   a. Category I – 1 ATTNA auto injector
   b. Category II – 2 ATTNA kits and 1 CANA if fasiculations are present
   c. Category III – 3 ATTNA kits and 1 CANA
5. Although additional doses of Pralidoxime are contraindicated, additional 2-4mg doses of Atropine can be administered until secretion related dyspnea subsides
6. Additional Diazepam can be administered as indicated for seizures
7. Ensure adequate oxygenation
8. Pulse oximetry is essential!
9. Be prepared to intubate and ventilate the patient!
10. If available cardiac monitoring is beneficial for the identification of possible dysrhythmias

DISPOSITION:

1. *Urgent* evacuation even if the patient appears stable.
2. They must be evaluated for permanent neurological effects.
3. Sustained atropine and pralidoxime will be given as indicated at higher care echelon.

CELLULITIS/CUTANEOUS ABSCESS PROTOCOL

SPECIAL CONSIDERATIONS:
1. Superficial bacterial skin infection
2. Generally begins about 24 hours following a break in the skin, but more serious types of cellulitis may be seen as early as 6-8hr following animal or human bites.
3. If abscess formation occurs, only attempt I&D in the tactical setting IF:
   a. The abscess is clearly well demarcated, superficial, or can be discerned by ultrasound.
   b. Local anesthesia is available.

SIGNS AND SYMPTOMS:
1. Painful, erythematous, swollen, tender area.
2. Fever may or may not be present.
3. Typically, erythema spreads without treatment.
4. Rapidly spreading and very painful infections suggest the possibility of necrotizing fasciitis, a life-threatening infection of the deeper tissues that should be treated per ***Sepsis/ Septic Shock Protocol (TMEP)***.
5. Fluctuant, tender, well-defined mass indicates abscess formation.

MANAGEMENT:
1. Moxifloxacin (Avelox®) 400mg PO qd for 10 days **OR** amoxicillin/clavulanic acid (Augmentin®) 875mg PO bid.
2. **PLUS EITHER** trimethoprim-sulfamethoxazole (Septra®) DS 1 tab PO bid **OR** rifampin (Rifadin®) 600mg PO bid for 10 days.
3. Clean and dress wound and surrounding area.
4. Use a pen to mark the demarcation border of the infection and re-evaluate in 24 hours.
5. Limit activity until infection resolves.
6. Add ertapenem (Invanz®) 1gm IV / IM qd if worsening at 24 hours or no improvement at 48 hours of treatment.
7. **IF ABSCESS IS PRESENT:**
   a. Incise and drain (I&D) if the environment permits:
      i. Establish sterile incision site with Betadine
      ii. Local anesthesia using lidocaine
      iii. Incise the length of the abscess cavity, but no further
      iv. Incision should be parallel to skin tension lines if possible
      v. On initial treatment, leave wound open and pack with iodoform or dry sterile gauze, if available. On subsequent dressings, loosely pack the wound and leave gauze protruding to facilitate drainage (wick the wound). **DO NOT SUTURE THE SITE**.
   b. Bandage site and perform wound checks daily
8. Treat per ***Pain Management Protocol (TMEP)***.

DISPOSITION:
1. Re-evaluate daily and watch for progression of erythema while on antibiotics.
2. Cellulitis in critical areas (head, neck, hand, joint involvement, perineal) requires *Priority* evacuation.
3. Use of IV antibiotics requires *Priority* evacuation.

CELLULITIS

CELLULITIS WITH ABSCESS FORMATION

CHEST PAIN PROTOCOL

SPECIAL CONSIDERATIONS:

1. This protocol assumes no access to ACLS medications or monitoring/ defibrillation equipment.
2. Since the SO-ATP does not have access in the field to tests required to accurately determine the etiology of chest pain, early and rapid evacuation should be considered if tactically feasible. High risk etiologies include myocardial infarction (MI), unstable angina, pulmonary embolus, pericarditis, spontaneous pneumothorax, and esophageal rupture.

SIGNS AND SYMPTOMS - CARDIAC:

1. The presence of one or more of the following risk factors increases the likelihood of coronary artery disease: smoking, diabetes, hypertension, elevated cholesterol, obesity, family history of MI at a young age, and patient age over 40.
2. The following are signs and symptoms suspicious for myocardial infarction as the etiology for chest pain:
   a. Substernal chest pain that may radiate to the left arm, neck, or jaw
   b. Pain described as pressure or squeezing
   c. Pain exacerbated with exertion and relieved with rest
   d. Associated dyspnea, diaphoresis (sweating), nausea, lightheadedness, or syncope
   e. Tachycardia, irregular heart rhythm, or severe bradycardia
   f. Bilateral rales/ crackles in the lungs on auscultation
   g. Significant hypertension or hypotension

MANAGEMENT:

1. Aspirin (ASA) 325mg PO (non-enteric coated) - chew to speed absorption.
2. IV access with saline lock. Administer 250-500cc normal saline boluses as needed to correct hypotension with frequent reassessment.
3. Morphine sulfate 5mg IV initially, then 2mg q 10-15 min prn for pain unless hypotension is present. Maintain a minimum BP of 90mmHg systolic (palpable radial pulse).
4. Oxygen with pulse oximetry monitoring.
5. Avoid all exertion. Allow the patient to rest in a position of comfort. Frequently reassess the patient including hemodynamic status.

OTHER ETIOLOGIES OF CHEST PAIN:

1. The following signs and symptoms **MAY** suggest a GI etiology such as gastroesophageal reflux disease (GERD): dyspepsia, dysphagia, burning quality to chest pain, exacerbated by lying flat, foul or brackish taste in mouth. A trial of antacids or ranitidine (Zantac®) 150mg PO bid may be useful if evacuation will be delayed.
2. Severe chest pain following forceful vomiting may indicate esophageal rupture. Administer IV normal saline 150mL/hr and ertapenem (Invanz®) 1gm IV and evacuate as *Urgent*.
3. Sudden onset of pleuritic chest pain with dyspnea may indicate pulmonary embolus or spontaneous pneumothorax. Auscultate the lungs. Unilaterally diminished breath sounds suggest pneumothorax which may require decompression. Administer oxygen, establish IV access, administer aspirin (ASA) 325mg PO for suspected PE, and evacuate as *Urgent*.
4. The following signs and symptoms **MAY** suggest a musculoskeletal etiology: pain isolated to a specific muscle or costochondral joint pain exacerbated with certain types of movements, non-central chest pain reproduced upon palpation. A trial of NSAIDs such as ibuprofen (Motrin®) 800mg PO tid may be useful if evacuation will be delayed.
5. Chest pain with gradual onset and exacerbated by deep inspiration and accompanied by fever and productive cough **MAY** indicate lower respiratory tract infection. Consider treatment per ***Bronchitis/ Pneumonia Protocol (TMEP)***.

DISPOSITION:

1. *Urgent* evacuation.
2. Evacuation platform should include ACLS certified medical personnel and the equipment, supplies, and medications necessary for ACLS care.
3. Do not delay evacuation if unsure of chest pain etiology. Strongly consider early contact with a medical officer or medical treatment facility for consultation. Frequently reassess the patient suspected of a non-cardiac etiology to ensure stability and accuracy of the diagnosis.

COLD INJURY PROTOCOL

SPECIAL CONSIDERATIONS:
1. Refreezing after thawing results in a high probability of amputation.
2. Check for 60 seconds for pulse and respirations due to bradycardia.

SIGNS AND SYMPTOMS:
1. Hypothermia (Decreased core temperature)
   a. Mild - Shivering, poor coordination
   b. Moderate - Cessation of shivering, disorientation, slurred speech, confusion
   c. Severe - Unconscious
2. Freezing Cold Injury (Frostbite)
   a. Superficial - Skin is firm, but not hard; painful, red skin
   b. Deep - Painless, grey appearing skin. Skin is hard, white, grey, ashen, waxy in appearance
3. Non freezing cold injury
   a. Itching. Pale, cool, blotchy wet skin. Mild ulcerations may be present. Numbness and tingling sensations

MANAGEMENT:
1. Non freezing cold injury (NFCI);
   a. Gently drying and massage. Do not rub involved area.
   b. Elevate feet, warm torso, hydrate orally, dry socks.
   c. NSAIDS may help.
   d. Evacuation depends on ambulatory ability
   e. Active rewarming is contraindicated in the treatment of pernio or chilblains, however mixed frostbite and NFCI injuries require rapid rewarming for the frostbite injury, if it has not already thawed.
2. Freezing Cold Injury
   a. Do not walk on frozen feet / toes unless necessary for preservation of life
   b. Do not rub with snow/ice
   c. Do not vigorously massage tissue
   d. Do not use space heaters or dry heat sources (fire, MRE heaters, hand-warmers, etc.)
   e. Ibuprofen (Motrin®), 800mg PO tid (Consider other NSAIDs if ibuprofen (Motrin®) is not available)
   f. If thawed, refreezing will most likely result in amputation
   g. Once thawing has occurred, expect intense pain requiring narcotic use. Follow ***Pain Management Protocol (TMEP)***
   h. If refreezing likely:
      i. Do not attempt to thaw frostbitten tissue
      ii. Protect tissue from further injury by wrapping with dry Kerlix®-separate digits with dressing
   i. Refreezing not likely:
      i. Superficial
         1). Warm water immersion
         2). Warm extremity in axilla or groin
         3). Drainage of clear blisters may be considered
         4). Apply soft Kerlix® type dressing
      ii. Deep
         1). Warm water immersion 104-108 °F (40-42 °C) until tissue is soft (approximately 30 minutes)
         2). Apply loose dry dressing prior to transport
         3). Pain Management per ***Pain Management Protocol (TMEP)***
         4). Do not drain hemorrhagic blisters
3. Hypothermia
   a. Move to warm environment; remove any wet clothing; and replace it with dry coverings that will reducing further heat loss from evaporation, radiation, conduction, or convection; (e.g. HPMK™, Blizzard Blanket™, sleeping blanket with Mylar™ blanket, etc.).

b.

Do not put a cold patient in a shower or bath. A warm bath increases afterdrop. Vasodilation and increased afterdrop could provoke cardiovascular collapse or ventricular fibrillation.
c. Shield from wind
d. If able to tolerate PO, provide food and hydrate patient
e. Mild: exercise in place
f. Moderate / Severe:
    i. Do not exercise patient. Maintain supine position on insulation
    ii. Do not give patients food or oral fluids
    iii. If IV fluids are indicated, administer glucose-containing IV fluids warmed to 104 °F (40 °C) or 1 amp of D50
    iv. Begin active rewarming with heat source (e.g., Ready-Heat™ blanket, hot water bottles, chemical packs, etc.)
    v. If unconscious:
        1). Avoid sudden movements and rough handling due to increased ventricular fibrillation risk
        2). Assure airway patency
        3). Check for 60 seconds for pulse and respirations due to bradycardia
        4). If not breathing, begin ventilations
        5). If no pulse, begin chest compressions only if patient will not arrive in medical facility in 3 hours.

References:
State of Alaska Cold Injury Guidelines, 2014,
http://dhss.alaska.gov/dph/Emergency/Documents/ems/documents/Alaska%20DHSS%20EMS%20Cold%20Injuries%20Guidelines%20June%202014.pdf
SOF Medical Handbook, 2009

DISPOSITION:
1. *Urgent* evacuation for moderate/ severe hypothermia cases to a facility capable of active rewarming and resuscitation.
2. *Priority* evacuation for cases of freezing cold injuries (frostbite).
3. *Routine* evacuation for cases of non-freezing cold injury which are non-ambulatory.
4. Evacuation not necessary for cases of non-freezing ambulatory cold injuries

CONSTIPATION/ FECAL IMPACTION PROTOCOL

SPECIAL CONSIDERATIONS:
1. Differential diagnosis includes acute appendicitis, volvulus, ruptured diverticulum, bowel obstruction, pancreatitis, or parasitic infections.
2. Acute onset, severe pain, point tenderness, and fever indicate etiologies other than constipation or fecal impaction.

SIGNS AND SYMPTOMS:
1. Recent history of infrequent passage of hard, dry stools or straining during defecation.
2. Abdominal pain, which is typically poorly localized with cramping.
3. If pain becomes severe and is associated with nausea / vomiting and complete lack of flatus or stools, consider a bowel obstruction.

MANAGEMENT:
1. Perform digital rectal examination to check for fecal impaction. Often times this is the only intervention necessary.
2. Bisacodyl (Dulcolax®) 10mg PO tid prn
3. Avoid narcotics as this will exacerbate the constipation.
4. For impacted stool or no relief with above measures, give normal saline enema 500mL via lubricated IV tubing. (Pt should retain solution for two minutes before evacuating contents)
5. If fecal impaction is still present, perform digital disimpaction, if trained.
6. Increase PO fluid intake.
7. Increase fiber (fruits, bran, and vegetables) in diet if possible.
8. If severe pain, rigid board-like abdomen, fever, and/ or rebound tenderness develop, or moderate to large amounts of blood are present in the stool, then treat per ***Abdominal Pain Protocol (TMEP)***.

DISPOSITION:
1. Evacuation is usually not required for this condition.
2. *Routine* evacuation if no response to therapy.

CONTACT DERMATITIS PROTOCOL

SPECIAL CONSIDERATIONS:

1. Insect bite(s) as a differential diagnosis - also accompanied by itching, but with discrete red papular lesions(s).
2. Cellulitis as a differential diagnosis - bright red, painful, non-pruritic, and typically becomes steadily worse without antibiotics.
3. Fungal infection as a differential diagnosis - not always pruritic; infection site(s) slowly enlarge without therapy.
4. Effects are particularly dangerous if contact in or around the eyes.

SIGNS AND SYMPTOMS:

1. Acute onset
2. Skin erythema
3. Intense itching (pruritus)
4. Edema, papules, vesicles, bullae, discharge, and / or crusting may be visible.

MANAGEMENT:

1. Change clothes when possible and bag original clothes until they can be machine washed.
2. Wash area with mild soap and water.
3. Apply cold wet compress to affected area to help decrease itching.
4. If available, apply 1% hydrocortisone cream to the affected area and cover with a dry dressing to help prevent spread to other parts of the body or clothing.
5. In severe cases, dexamethasone (Decadron®) 10 mg IM / PO qd for 5 days. **IF POISON IVY, OR OTHER PLANT-ASSOCIATED DERMATITIS IS SUSPECTED, TAPER DOSE OVER 14 DAYS (10 MG FOR 5 DAYS, 8 MG FOR 2 DAYS, ETC)**
6. Give diphenhydramine (Benadryl®) 25 - 50 mg PO q 6hr prn itching, if tactically feasible. (Sedation may occur.)

DISPOSITION:

1. Evacuation not needed for mild cases.
2. Priority evacuation for severe symptoms: intra-oral, eye involvement, or >50% body surface area (BSA) involvement.
3. Monitor for secondary infection; treat per ***Cellulitis/Cutaneous Abscess Protocol (TMEP)*** if suspected on the basis of increasing pain, redness, or purulent crusting.

CORNEAL ABRASIONS/ CORNEAL ULCERS/ CONJUNCTIVITIS PROTOCOL

SPECIAL CONSIDERATIONS:

1. Contact lens corneal abrasions are at a high risk for development of a corneal ulcer. They should not be patched and require more intensive antibiotic therapy.
2. Consider LASIK Flap dislocation for anyone that sustains eye trauma after LASIK surgery.
3. If vesicant (sulfur mustard) exposure, onset of symptoms <12 hours from exposure indicates moderate to severe exposure.

SIGNS AND SYMPTOMS:

1. History of eye trauma, contact lens wear, or chemical exposure.
2. Eye pain - typically becoming worse over several days
3. Eye redness
4. Tearing
5. Blurred vision
6. Light sensitivity
7. Fluorescein stain positive
8. White or gray spot on cornea for corneal ulcer (usually need tangential penlight exam to see)
9. For sudden onset of eye pain after trauma in a patient with LASIK surgery, consider LASIK flap dislocation

MANAGEMENT:

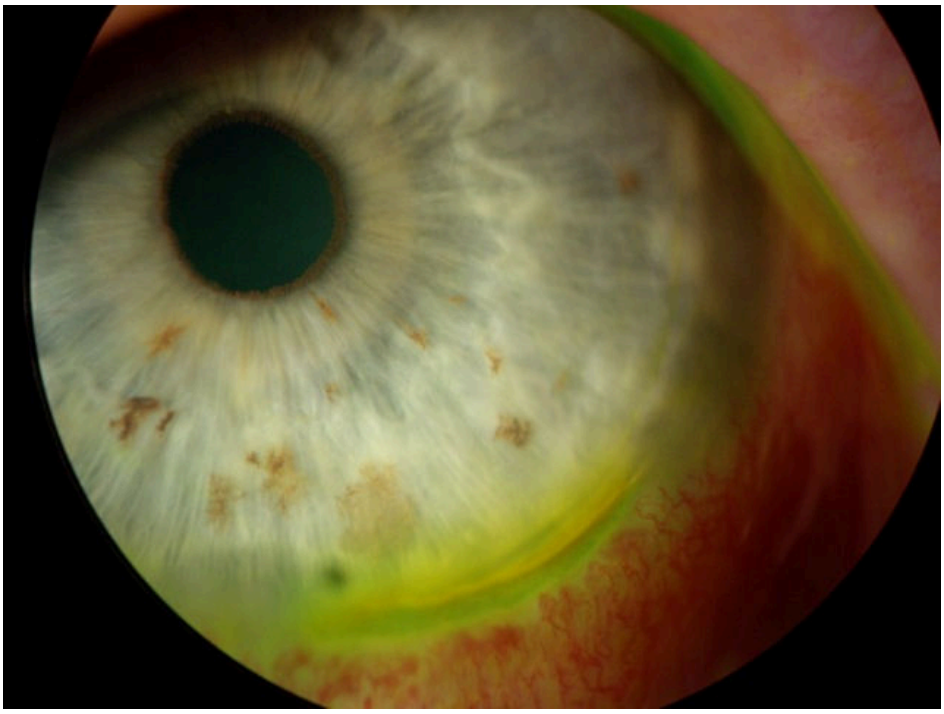
1. If chemical exposure, immediately irrigate with large volume of water.
2. Remove contact lens(es) if worn.
3. Tetracaine 0.5%, 2 drops in the affected eye for pain relief. Do not dispense to patient.
4. Check for foreign body to include eyelid eversion. Irrigate with normal saline prn.
5. Gatifloxacin (Zymar®) 0.3% drops - 1 drop in the affected eye qid while awake.
6. Treat per ***Pain Management Protocol (TMEP)***.
7. Reduce light exposure, stay indoors if possible - sunglasses if not possible.
8. For corneal abrasions: monitor daily for worsening signs and symptoms of a corneal ulcer (increasing pain and development of a white or grey spot at abrasion site). **DO NOT PATCH.**
9. Assess using fluorescein drops daily — abrasions should get progressively smaller. Continue antibiotic drops until 24 hours after cornea becomes fluorescein negative (no bright yellow spot).
10. **IF CORNEAL ULCER PRESENTS**: Increase gatifloxacin (Zymar®) drops to q 2hr and *Priority* evacuation.

DISPOSITION:

1. Evacuation may not be needed for corneal abrasion if improving with treatment.
2. *Urgent* evacuation for LASIK flap dislocation
3. *Priority* evacuation for Corneal Ulcer, conjunctivitis onset <12hours after vesicant exposure.

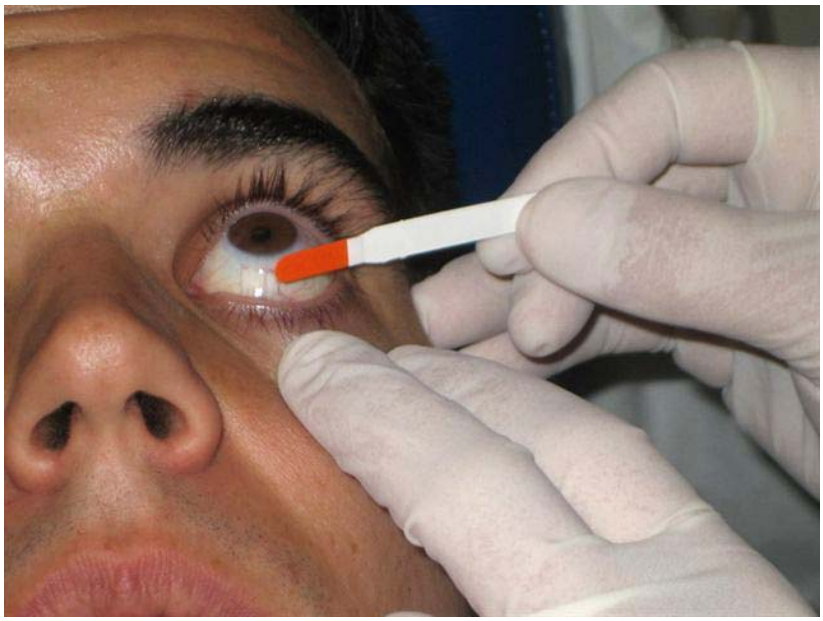
EYE PATHOLOGY

CONJUNCTIVITIS

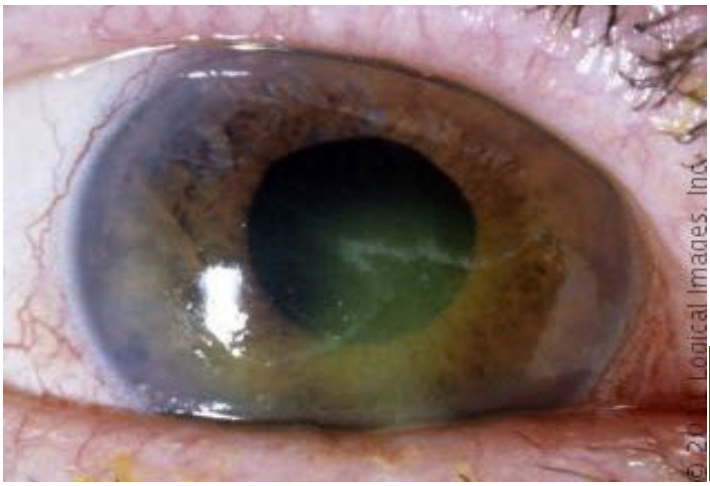


PARTIALLY DISLOCATED LASIK FLAP
(Notice smooth semicircular dye stained cut at the 4-6 o'clock position on the corneal margin. This represents the surgical incision that has failed to completely heal).

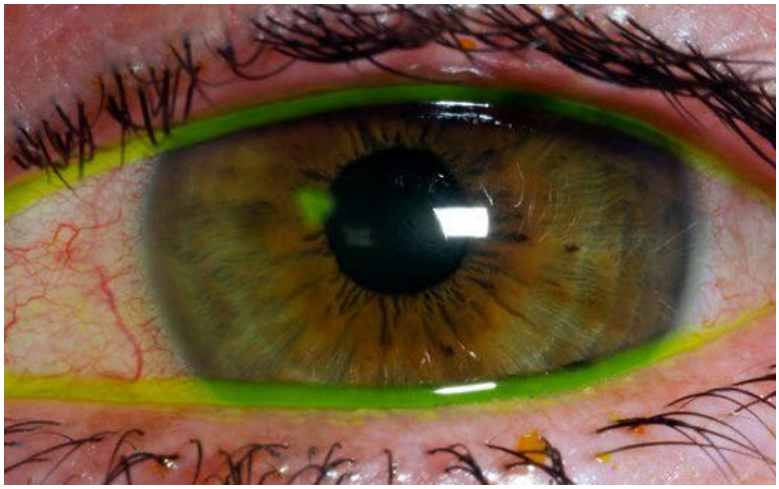
Instillation of fluorescein dye into the eye.



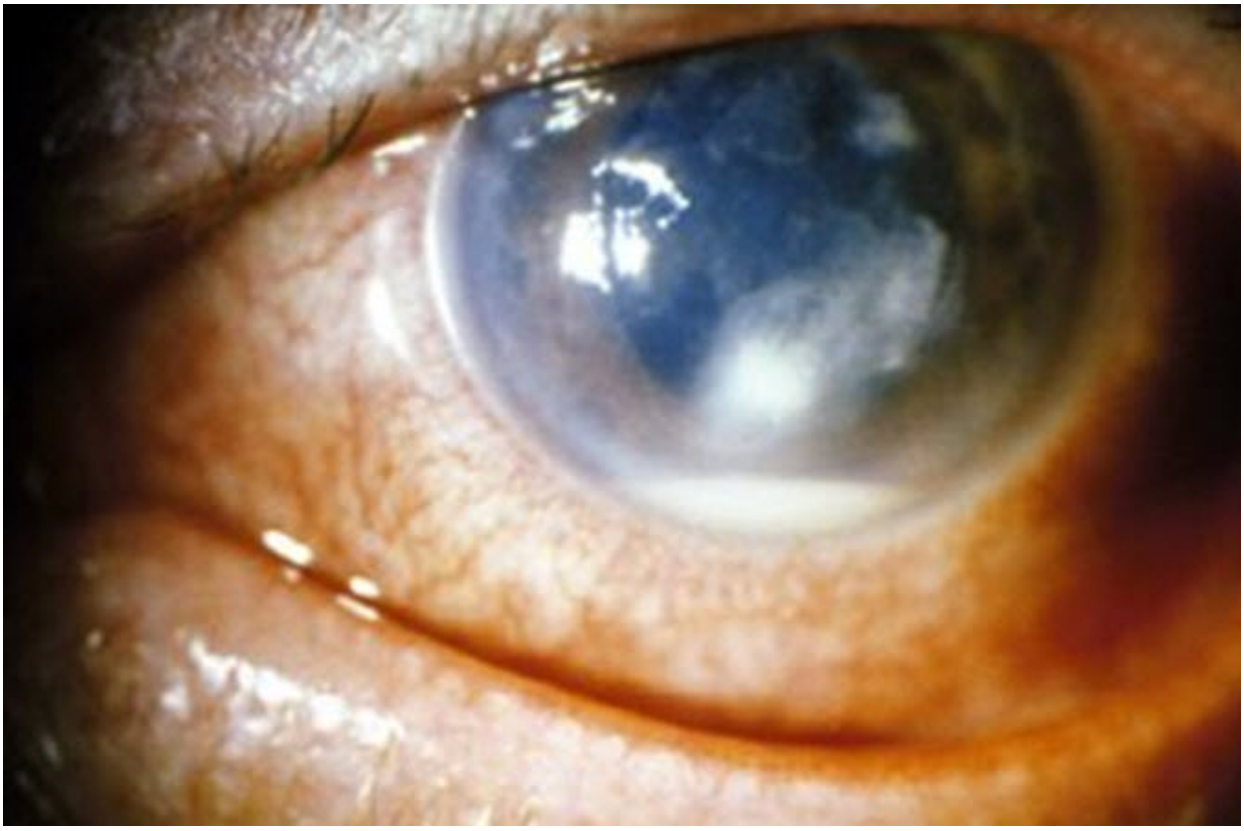
Notice faint green irregular line on cornea that represents the fluorescein stain of the abrasion



Notice the triangular-shaped abrasion at the 10 o'clock position on the cornea, stained with fluorescein



CORNEAL ABRASION DIAGNOSED USING FLUORESCEIN STAIN



CORNEAL ULCER
(White area on cornea that is visible WITHOUT fluorescein dye)

COUGH PROTOCOL

SPECIAL CONSIDERATIONS:
Usually viral etiology, but may also occur with high altitude pulmonary edema (HAPE) and pneumonia.

SIGNS AND SYMPTOMS:
1. Cough with or without scant sputum production
2. Often accompanied by other signs and symptoms of upper respiratory tract infection (i.e., sore throat and rhinorrhea).

MANAGEMENT:
1. Treat symptomatically using benzocaine (Cepacol®) lozenges or other appropriate medications) when the findings on history and physical do not suggest pneumonia.
2. Albuterol (Ventolin®) metered dose inhaler 3-4 puffs q 4hr may also help control coughing.
3. Encourage PO hydration.
4. Avoid respiratory irritants (smoke, aerosols, etc).
5. If associated with URI symptoms, treat per ***Allergic Rhinitis/ Hay Fever/ Cold-Like Symptoms Protocol (TMEP)***.
6. If at altitude, pull balaclava over nose and breathe through it for warm humidified air.

DISPOSITION:
1. Evacuation is usually not required.
2. If accompanied by fever, chest pain, dyspnea, and / or colored sputum (green, dark yellow, or red-tinged), treat per ***Bronchitis/ Pneumonia Protocol (TMEP)***.

DEEP VENOUS THROMBOSIS (DVT) PROTOCOL

SPECIAL CONSIDERATIONS:
1. Risk factors include trauma, long airplane rides, high altitude exposure, and genetic predisposition.
2. May be confused with a ruptured Baker's cyst in a tactical setting.

SIGNS AND SYMPTOMS:
1. Asymmetric pain and swelling in a lower extremity (often the calf muscles).
2. Warmth over affected area.
3. Increased pain in the affected calf muscles with dorsiflexion of the foot (Homans' Sign).

MANAGEMENT:
1. Monitor patient with pulse oximetry (sudden decrease in oxygen saturation suggests a pulmonary embolism.)
2. ASA 325mg PO
3. If sudden chest pain or respiratory distress occurs, consider pulmonary embolus and administer oxygen if available.
4. Immobilize the affected extremity.

DISPOSITION:
1. *Priority* evacuation if no respiratory distress or chest pain.
2. *Urgent* evacuation If respiratory distress or chest pain are present

DEHYDRATION PROTOCOL

SPECIAL CONSIDERATIONS:
1. Troops in the field are often chronically dehydrated.
2. Prolonged missions, acute diarrhea (gastroenteritis), viral / bacterial infections, and environmental factors (heat stress or strenuous activity) all may exacerbate dehydration.
3. May also occur in cold or high altitude environments.

SIGNS AND SYMPTOMS:
1. Lightheadedness (worse with sudden standing)
2. Mild headache (especially in the morning)
3. Dry mucosa
4. Decreased urinary frequency and volume
5. Dark urine
6. Degradation in performance

MANAGEMENT:
1. Increase oral fluids if tolerated.
   a. If available, use carbohydrate/ electrolyte drink mixes for fluid replacement diluted to a 1:4 solution.
   b. Avoid fluids containing caffeine.
2. If unable to tolerate PO fluids, use an initial bolus of 1 liter normal saline IV, followed by repeat attempt at PO hydration. If still unable to tolerate PO hydration, repeat 1 liter bolus of normal saline IV. If normal saline is not available, use available IV fluids.

DISPOSITION:
1. Monitor closely for recurrence of dehydration.
2. *Priority* evacuation if dehydration persists after treatment.

DENTAL PAIN PROTOCOL

SPECIAL CONSIDERATIONS:

1. Most common causes are deep decay, fractures of tooth crown/root, acute periapical (root end) abscesses, or pericornitis (pain associated with an impacted wisdom tooth).
2. If tooth pain occurs during flight, consider barodontalgia and refer to the ***Barotrauma Protocol (TMEP)***

SIGNS AND SYMPTOMS:

1. Intermittent or continuous pain (usually intense), heat or cold sensitivity
2. Visibly broken / cracked tooth
3. Severe pain on percussion
4. Intraoral swelling / abscess
5. Partially erupted wisdom tooth
6. Lost filling

MANAGEMENT:

1. Treat per ***Pain Management Protocol (TMEP)***.
2. If signs and symptoms of infection are present, administer amoxicillin/clavulanic acid (Augmentin®) 875mg PO bid for 7 days **OR** azithromycin (Zithromax®) Z-PAK® 500mg PO initially followed by 250mg PO qd x 4 days.
3. If gums appear swollen and red, encourage increased oral hygiene and warm saline rinses bid.
4. If filling is lost, consider temporary filling/patch.

DISPOSITION:

1. Evacuation usually not necessary.
2. *Routine* evacuation if not responding to therapy.

DETERMINATION OF DEATH / DISCONTINUING RESUSCITATION PROTOCOL

SPECIAL CONSIDERATIONS:

1. Immediate determination of death is appropriate in a trauma patient without pulse or respirations in the setting of multiple casualties when resuscitative efforts would hinder the care of more viable patients.
2. Patients that are struck by lightning, have hypothermia, cold-water drowning, or intermittent pulses may require extended cardiopulmonary resuscitation
3. It is assumed that personnel do not have access to ECG, or other monitoring equipment to evaluate heart rhythm, or deliver countershocks.

SIGNS AND SYMPTOMS:

1. Obvious Death - Persons who, in addition to absence of respiration, cardiac activity, and neurologic reflexes have one or more of the following:
    a. Decapitation
    b. Massive crushing and / or penetrating injury with evisceration of the heart, lung or brain
    c. Incineration
    d. Decomposition of body tissue
    e. Rigor mortis or post-mortem lividity

MANAGEMENT:

1. In the setting of obvious death, resuscitative efforts should not be initiated.
2. If resuscitative efforts have been initiated, consider termination of resuscitation:
    a. After 15 minutes (if the cause is unknown or due to trauma)
    b. or after 30 minutes (when the cause is due to hypothermia, electrical injury, lightning strike, cold water drowning, or other cause known to require a prolonged resuscitative effort) when:
        i. There is persistent absence of pulse and respirations despite assuring airway patency and effective ventilation as well as administration of resuscitative fluids and medications.
        ii. Pupils are fixed and dilated. This is not applicable in the setting of lightning strikes or in the presence of drugs that cause pupil dilatation.
        iii. No response to deep pain above or below the clavicles
        iv. Absence of end-tidal CO_2, (either colorimetric or wave form) from a correctly placed endotracheal tube or alternative airway.
        v. Absence of cardiac activity on ultrasound examination.
3. If there is any question as to the discontinuation of resuscitative efforts, then a medical officer should be contacted for guidance.

DISPOSITION:

1. Evacuation of the remains when tactically feasible.
2. In the event of return of spontaneous circulation, *Urgent* Evacuation.

EAR INFECTION PROTOCOL (INCLUDES *OTITIS MEDIA* AND *OTITIS EXTERNA*)

SPECIAL CONSIDERATIONS:

1. Infection of the middle or external ear may be viral or bacterial in etiology.
2. Increased pressure in the middle ear may cause intense pain and may result in rupture of the tympanic membrane (characterized by sudden decrease in pain and drainage from ear canal.)

SIGNS AND SYMPTOMS:

1. *Otitis Media*
   a. Ear pain
   b. Decreased hearing
   c. Inflamed, bulging ear drum on otoscope exam
2. *Otitis Externa*
   a. Ear canal drainage
   b. Pain on motion of tragus (outer ear)
   c. Cracked, red, inflamed external auditory canal

MANAGEMENT:

1. ***Otitis Media***

Moxifloxacin (Avelox®) 400mg PO qd for 10 days **OR** azithromycin (Zythromax®) Z-PAK® 500mg PO initially followed by 250mg PO qd x 4 days.

2. **Otitis *Externa***

Gatifloxacin (Zymar®) drops, 5 drops tid - qid until symptoms remain resolved for 48 hours.

3. Treat per ***Pain Management Protocol (TMEP)***.

4.

If water immersion is anticipated, use ear plugs to prevent cold water entry which will cause vertigo.

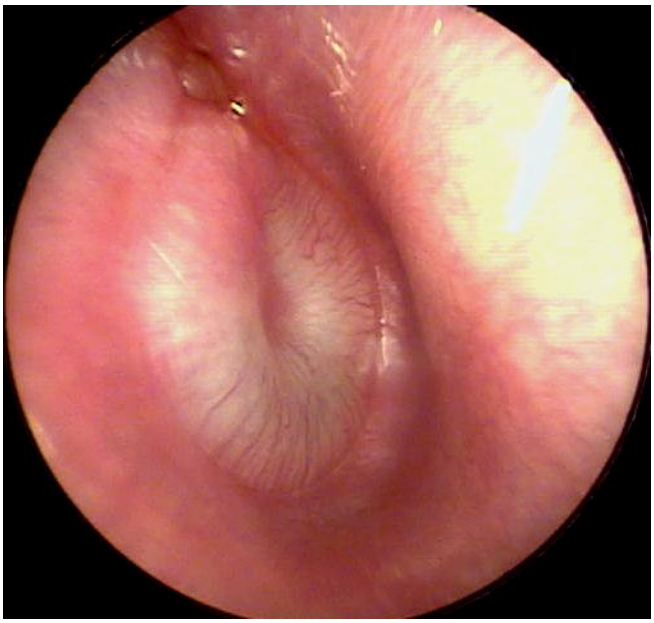
DISPOSITION:

1. For uncomplicated cases, no evacuation is necessary.
2. *Routine* evacuation for complicated cases not responding to therapy

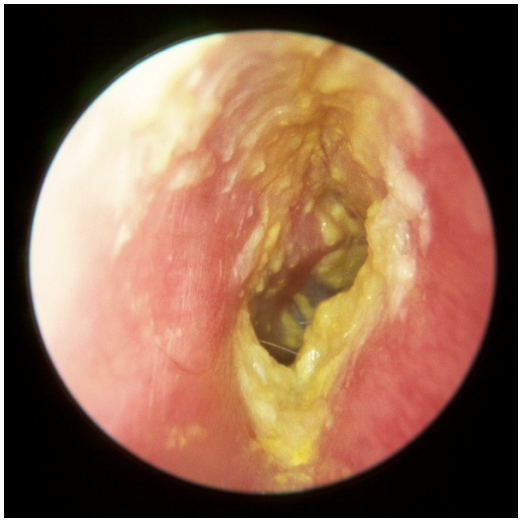
TYMPANIC MEMBRANE PICTURES

NORMAL TYMPANIC MEMBRANE
(No fluid levels, no bulging)

OTITIS MEDIA
(Notice erythematous, inflamed, bulging tympanic membrane)



OTITIS EXTERNA
(Crusty weeping drainage from external auditory canal)



ENVENOMATION PROTOCOL
SNAKE ENVENOMATIONS

SPECIAL CONSIDERATIONS: - GENERAL:
Toxic envenomations from a variety of sources, including insects, spiders, bees/wasps, scorpions, snakes, or marine life are all capable of causing life-threatening anaphylaxis and should be treated according to the ***Anaphylactic Reaction Protocol (TMEP)***.

SPECIAL CONSIDERATIONS: - SNAKES:
1. Only a minority of snakebites from toxic snakes involve severe, life-threatening envenomations.
2. Incision, excision, electrical shock, tourniquet, oral suction, and cryotherapy should **NOT** be performed to treat snakebites.
3. Suction device is not effective for removing snake venom from a wound. If previously placed, it should be left in place until patient reaches higher level of care.

SNAKE SIGNS AND SYMPTOMS:
1. Crotalinae (pit vipers, rattlesnake, moccasin, bushmaster)
   a. Sudden pain
   b. Erythema
   c. Ecchymosis
   d. Hemorrhagic bullae
   e. Bleeding from site
   f. Metallic taste
   g. Hypotension/ shock
   h. Swelling/edema
2. Elapids (Coral snake, sea snake, mamba, cobra, taipan, kraits)
   a. Cranial Nerve dysfunction (i.e., ptosis, difficulty swallowing)
   b. Paresthesias
   c. Fasciculations
   d. Weakness
   e. Altered mental status

MANAGEMENT OF SNAKE BITES:
1. If signs and symptoms of anaphylaxis present, treat per ***Anaphylaxis Protocol (TMEP)***.
2. Supportive care as necessary
3. Treat per ***Pain Management Protocol (TMEP)*** *using narcotics. Avoid NSAID use.*
4. Treat per ***Nausea and Vomiting Protocol (TMEP)***.
5. If toxic snakebite suspected (significant pain, edema, evidence of coagulopathy or neurologic signs/symptoms):
   a. Minimize activity and place on a litter
   b. Remove all constricting clothing and jewelry
   c. Start IV in unaffected extremity
   d. Monitor and record vital signs and extent of edema every 15-30 minutes
   e. IV crystalloid for hypotension as necessary
   f. Immobilize affected limb in neutral position
   g. A compression wrap (proximal to distal) may be helpful with an Elapidae (neurotoxic) snake (cobra, mamba, coral snake), but is not indicated with Crotalinae (pit viper) bites.
   h.

The need for a fasciotomy is difficult to determine in a snake bite unless compartment pressures have been taken**.**
   i.

Cold therapy and suction therapy is contraindicated in snakebites.

DISPOSITION:
1. *Urgent* evacuation if treated for anaphylaxis.
2. *Urgent* evacuation for Elapidae bites or if evidence of severe envenomation (systemic signs and symptoms, progressive ascending edema) exists.
3. Evacuation not required for Crotalinae bites if signs and symptoms do not indicate anaphylaxis or development of severe envenomation after four hours of observation.

MARINE ENVENOMATIONS

SPECIAL CONSIDERATIONS:
1. Envenomation results from stings by jellyfish, fire corals, sting rays, sea urchins, bristle worms, fish spines, sea snakes, etc.
2. Jellyfish account for the vast majority of envenomations, which occur with contact to stinging cells on tentacles.
3. Stingrays are the most common cause of envenomation by marine vertebrates.
4. Sea snake venom is 2-10 times more potent than cobra venom, but only about 25% of those bitten develop symptoms (due to an inefficient delivery system and small mouth)
5. All of these envenomations are more likely to occur in intertidal regions, reefs, and surf zones

SIGNS AND SYMPTOMS:
1. Envenomation by jellyfish:
   a. Contact with jellyfish tentacles causes immediate, intense sharp and burning pain, followed by local, linear erythematous eruption.
   b. Severe stings can cause anaphylactic reaction, hematuria, vomiting, syncope, hypotension, or paralysis.
2. Envenomation by fire coral is similar to jellyfish, but less severe and rarely causes complications. Pain symptoms usually resolve within 12 hours.
3. Envenomation by stingray:
   a. Spine on tail contains retro-serrated teeth, with a venom gland along the groove.
   b. Envenomation causes immediate, intense pain at site of injury out of proportion to what it looks like, edema.
   c. Pain tends to peak 30-60 minutes after puncture and can last for several days.
   d. Rare systemic symptoms include limb paralysis, hypotension, and bradycardia.
4. Envenomation by sea urchin:
   a. Frequently cause multiple deep puncture wounds when stepped on.
   b. Puncture and envenomation causes immediate, intense pain, erythema and local swelling.
   c. If more than 15-20 punctures are present then severe systemic symptoms can occur.
5. Envenomation by bristleworms:
   a. Is caused by contact with bristle-like setae on feet of animal.
   b. Contact is like brushing against a cactus plant and may result in many fine bristles embedded in the skin.
   c. Causes painful inflammation, which is almost never serious.
6. Envenomation by fish spines:
   a. First symptom is usually immediate localized pain out of proportion to clinical manifestations, lasting minutes to hours.
   b. Puncture wound is usually cyanotic, with surrounding erythema and edema
   c. Pain is often noted in proximal lymph nodes.
   d. Symptoms can progress to delirium, malaise, nausea, vomiting, and elevated temperature.
   e. Infrequently leads to shock and death.
7. Envenomation by sea snake bites:
   a. Fang and teeth marks consist of small puncture wounds and may number from 1-20.
   b. Latent period of 10 minutes to several hours between bite and onset of symptoms.
   c. May initially present with mental status changes, including euphoria, anxiety or restlessness.
   d. Progresses to dry throat, nausea, vomiting, generalized weakness and paralysis, leading to respiratory distress/failure.
8. Envenomation by blue-ringed octopus bite:
   a. Bite is painless and may go unnoticed.

b. Patient may become paralyzed with respiratory distress.
c. Symptoms are usually rapid in onset and extremely variable in severity.

MANAGEMENT:

1. Stings (Jellyfish, Sea Wasp)
   a. Remove stinger, tentacles, etc. if possible with gloved hand, forceps or tape.
   b. Immediately flush with dilute acetic acid (vinegar). Alternative flush is isopropyl alcohol and seawater. Do not use fresh water.
   c. Topical lidocaine
   d. Topical steroids
   e. Follow ***Pain Management Protocol (TMEP)***
2. Bites (Sea snakes, blue ringed octopus) - See ***Envenomation Protocol (TMEP)***
3. Punctures (Sea urchin, stingray, fish spines, bristleworms)
   a. Remove all penetrating foreign bodies with gloved hand, forceps or tape.
   b. Irrigation with cold seawater.
   c. Soak the affected area in non-scalding water (110-115° F (43.3-46.1 °C)) for 30-90 minutes to inactivate toxins
   d. Ultrasound or x-ray (if available for retained foreign body)
   e. Antibiotics for deep puncture wounds: moxifloxacin (Avelox®).
   f. Follow ***Pain Management Protocol (TMEP)***

DISPOSITION:

1. *Urgent* evacuation if evidence of severe envenomation (cardiovascular collapse, anaphylaxis, paralysis, ascending edema of limb)
2. Evacuation not required if signs and symptoms do not indicate severe envenomation after 24 hours of observation.

INSECT / ARTHROPOD ENVENOMATIONS

SPECIAL CONSIDERATIONS: - Insect / Arthropod Bite:
In cases of suspected black widow spider bites, consider other causes for acute abdominal pain.

HYMENOPTERA (BEE, WASP, HORNET)
SIGNS AND SYMPTOMS:

1. Pain
2. Swelling / edema
3. Puncture site(s) from stinger or fangs
4. Warmth
5. Erythema
6. Signs of anaphylaxis

MANAGEMENT:

1. If signs and symptoms of anaphylaxis present, treat per ***Anaphylaxis Protocol (TMEP)***
2. Remove stinger by scraping from side.
3. Apply ice or cold water.
4. Apply topical 1% hydrocortisone cream.
5. Apply topical lidocaine.
6. Ibuprofen (Motrin®) 800mg PO tid x 7 days
7. Diphenhydramine (Benadryl®) 25-50mg q 6hr prn PO / IV.

ARTHROPOD (Spider)

1. Black Widow (Red hour glass on back)

   a. **SIGNS AND SYMPTOMS:**
      i. Pinching bite followed by local swelling and burning
      ii. Large muscle group spasms/tremors
      iii. Abdominal pain and/or rigidity within 60 minutes
      iv. Nausea and vomiting
      v. Diaphoresis
      vi. Hypertension
      vii. Tachycardia

   b. **MANAGEMENT:**
      i. Treat per ***Pain Management Protocol (TMEP)*** *(narcotic analgesia)*
      ii. Diazepam (Valium®) 2-10mg PO q 6-8hr or 5-10mg IV/IM for relief of muscle spasm
      iii. Diphenhydramine (Benadryl®) 25-50mg q 6hr prn PO / IV.

2. Brown Recluse (Notice violin shape on back)

   a. **SIGNS AND SYMPTOMS:**
      i. Local pain and ulceration at site within 2-8 hours with surrounding erythema
      ii. Hemorrhagic vesicle progressing to slowly enlarging eschar
      iii. Fever, chills, nausea, joint pain

   b. **MANAGEMENT:**
      i. Elevate bite site
      ii. Avoid strenuous activity
      iii. Treat per ***Pain Management Protocol (TMEP)*** *(narcotic analgesia)*
      iv. Diphenhydramine (Benadryl®) 25-50mg q 6hr prn PO / IV.
      v. Use an antibiotic appropriate for MRSA if cellulitis exists.

SCORPION

SIGNS AND SYMPTOMS:

1. Local pain, swelling, and erythema
2. Nausea and vomiting
3. Paresthesias
4. Tongue fasiculations
5. Sympathetic (tachycardia, hypertension, hyperthermia) or parasympathetic (hypotension, bradycardia, hypersalivation, incontinence) overdrive at develop
6. Seizures
7. Agitation
8. Blurry vision/Rotary eye movements

MANAGEMENT:

1. Treat per ***Pain Management Protocol (TMEP)***
2. Treat per ***Nausea and Vomiting Protocol (TMEP)***
3. Apply ice packs to bite site
4. Supportive care as necessary
5. Diphenhydramine (Benadryl®) 25-50mg q 6hr prn PO / IV.

DISPOSITION:

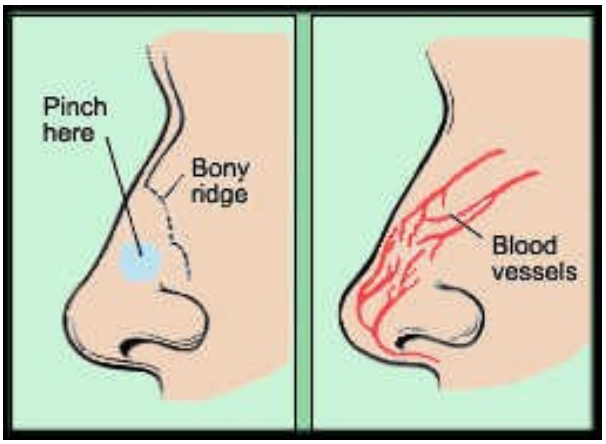
1. *Urgent* evacuation for development of abdominal rigidity
2. *Urgent* evacuation for development of systemic signs.
3. *Urgent* evacuation for anaphylaxis
4. *Routine* evacuation for tissue necrosis of brown recluse bite
5. Evacuation typically not required for localized insect stings and scorpion bites.

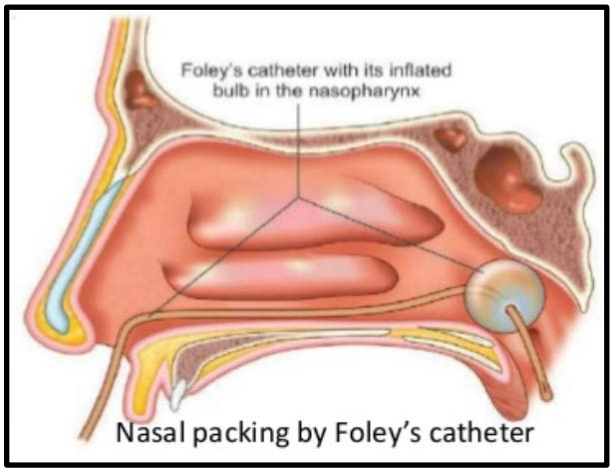
EPISTAXIS PROTOCOL

SPECIAL CONSIDERATIONS:
1. Common at high altitude and in desert environments due to mucosal drying.
2. May be anterior or posterior
3. Posterior epistaxis may be difficult to stop and may cause respiratory distress due to blood flowing into the airway. This type of epistaxis is uncommon in young healthy adults. It is more commonly seen in older, hypertensive patients.

SIGNS AND SYMPTOMS:
1. Nosebleed
2. Often previous history of nosebleeds
3. Usually anterior

MANAGEMENT:
1. Clear clots and other material from airway (if required) by having patient sit up, lean forward, and blow his/her nose. Pinch nose as shown and have patient lean forward.
2. **If BLEEDING CONTINUES:**
   a. Oxymetazoline (Afrin®) nasal spray 2 squirts in each nostril then pinch anterior area of nose firmly for full 10 minutes **WITHOUT RELEASING PRESSURE.**
   b. If bleeding continues, insert oxymetazoline (Afrin®) soaked nasal sponges (or small pieces of hemostatic gauze) bilaterally along the floor of the nasal cavity. Continue pinching the nose just below the nasal bridge for 10 minutes.
3. Once bleeding has stopped (after 30 minutes), remove the oxymetazoline (Afrin®) nasal sponge (or hemostatic gauze) and apply mupirocin (Bactroban®) to the affected nostril bid - tid.
4. Normal saline IV TKO prn (based upon severity of nose bleed)
5. **IF BLEEDING CONTINUES:** (Likely posterior)
   a. Prepare 14 French Foley catheter. (Tip is cut to minimize distal irritation.)
   b. Advance catheter along floor of nose (straight in) until visible in mouth.
   c. Fill balloon with 5mL of normal saline.
   d. Retract catheter until well opposed to posterior nasopharynx.
   e. Add an additional 5mL of normal saline to balloon.
   f. Clamp in place without using excessive anterior pressure.
   g. Moxifloxacin (Avelox®) 400mg PO qd until packing is removed.
   h. Leave balloon and packing in place for 72 hours.





DISPOSITION:
1. *Priority* evacuation for severe epistaxis not responding to therapy or if Foley catheter is used.
2. Evacuation may not be required if epistaxis is mild, anterior, and resolves with treatment.

FLANK PAIN PROTOCOL
(INCLUDES RENAL COLIC, PYELONEPHRITIS, KIDNEY STONES)

SPECIAL CONSIDERATIONS:
1. May proceed to life-threatening systemic infection.
2. May be associated with testicular torsion. Ensure normal external GU exam first.

SIGNS AND SYMPTOMS:
1. Urinary Tract Infection
   a. Dysuria
   b. Polyuria
2. Back pain
3. Flank pain
4. Nausea/ vomiting
5. Costovertebral angle tenderness
6. Fever
7. Hematuria

MANAGEMENT:
1. Treat per ***Pain Management Protocol (TMEP)***.
2. Treat per ***Nausea and Vomiting Protocol (TMEP)***.
3. Treat per ***Dehydration Protocol (TMEP)***.
4. If fever present:
   a. Moxifloxacin (Avelox®) 400mg PO qd **OR** amoxicillin/clavulanic acid (Augmentin®) 875mg PO bid
   b. Ceftriaxone (Rocephin®) 1gm bid IV / IM **OR** ertapenem (Invanz®) 1gm IV / IM if unable to tolerate PO or unresponsive to oral treatment.

DISPOSITION:
Priority evacuation for persistent flank pain and/or fever

FUNGAL SKIN INFECTION PROTOCOL

SPECIAL CONSIDERATIONS:
1. Insect bite(s), eczema, and contact dermatitis as differential diagnosis - are also accompanied by itching, but have discrete red papular lesion(s).
2. Cellulitis as a differential diagnosis - is bright red, painful, not pruritic, and typically becomes steadily worse without antibiotics.
3. Acute contact dermatitis as a differential diagnosis - is diagnosed by intense itching, skin erythema and a history of environmental exposure.

SIGNS AND SYMPTOMS:
1. Skin erythema
2. Pruritus is variable
3. Slow spreading
4. Borders of the erythematous plaques are generally irregular and / or circumscribed.
5. Often initially diagnosed as contact dermatitis but gets worse with use of steroids (those without antifungal agent added).
6. Most common sites of infection are feet ("athlete's foot" or tinea pedis), groin ("jock itch" or tinea cruris), scalp (tinea capitus), and torso or extremities ("ring worm" or tinea corporis).

MANAGEMENT:

1. Fluconazole (Diflucan®) 150mg PO once per week for four weeks (total of four doses in the absence of a cure, or 1 dose after clinically clear). If not resolved after 4 weeks, refer to physician.
2. Clean rigorously with mild soap without injuring the skin.

DISPOSITION:
Evacuation is usually not required for this condition.

ATHLETE'S FOOT (FUNGAL INFECTION - Tinea Pedis)

GASTROENTERITIS PROTOCOL

SPECIAL CONSIDERATIONS:

1. Etiology of acute diarrhea is often viral, but bacterial or parasitic infections are common in the deployed environment.
2. Emerging fluoroquinolone resistance among enteropathogenic E. Coli and Campylobacter makes azithromycin the new primary agent for therapy.
3. Consider antibiotic-related diarrhea if on antibiotics at onset.
4. Consider parasitic infection if symptoms persist for 3 or more days.
5. Must rule out malaria if fever and GI symptoms exist in a malarious area.

SIGNS AND SYMPTOMS:

1. Acute onset of nausea, vomiting, and diarrhea
2. Fever may or may not be present.

MANAGEMENT:

1. Loperamide (Imodium®) 4mg PO initially, then 2mg PO after every loose bowel movement with a maximum dose of 16mg per day.
2. WARNING Do not use loperamide (Imodium®) in the presence of fever or bloody stools.
3. Azithromycin (Zithromax®) 500mg PO qd for 3 days or moxifloxacin (Avelox®) 400mg PO qd for 3 days.
4. Treat per ***Nausea and Vomiting Protocol (TMEP)***.
5. Treat per ***Dehydration Protocol (TMEP)***.
6. If diarrhea persists after 3 days of therapy, or diarrhea develops while already on antibiotics, give Metronidazole (Flagyl®) 500mg PO tid for 10 days.

DISPOSITION:

1. *Urgent* evacuation if grossly bloody stools or circulatory compromise
2. *Priority* evacuation if dehydration occurs despite above therapy.
3. *Routine* evacuation if diarrhea develops while already on antibiotics,

HEADACHE PROTOCOL

SPECIAL CONSIDERATIONS:
1. The number of differential diagnoses for the acute headache is large and includes disorders that encompass the spectrum of minor to severe underlying disorders.
2. Consider altitude sickness, intracranial bleeds, meningitis and carbon monoxide poisoning.

SIGNS AND SYMPTOMS:
1. If the headache is atypical for the patient, check for elevated blood pressure (if possible), fever, neck rigidity, visual symptoms, mental status changes, motor-sensory deficits, and hydration.

MANAGEMENT:
1. If the patient has fever, nuchal rigidity, photophobia, petechial rash, or nausea and vomiting, treat per ***Meningitis Protocol (TMEP)****.*
2. Treat per ***Pain Management Protocol (TMEP)*** *(to exclude use of narcotics).*
3. If headache is accompanied by nausea and / or vomiting, treat per ***Nausea and Vomiting Protocol (TMEP)***.
4. Oxygen if other therapies are ineffective.
5. If dehydration is suspected, treat per ***Dehydration Protocol (TMEP)***.
6. If at altitude, treat per ***Altitude Illness Protocol (TMEP)****.*

DISPOSITION:
1. Evacuation is usually not required if the headache responds to therapy.
2. Acute headache in the presence of fever, severe nausea and vomiting, mental status changes, focal neurological signs, or preceding seizures, loss of consciousness, or a history of "it's the worst headache in my life" constitutes a true emergency and requires *Urgent* evacuation. Also consider *Urgent* evacuation for anyone without a prior history of headaches if their pain is severe.

HEAD AND NECK INFECTION PROTOCOL
(INCLUDES EPIGLOTTITIS AND PERITONSILLAR ABSCESS)

SPECIAL CONSIDERATIONS:
1. Most common causes in young healthy patients include odontogenic (dental origin) cutaneous sources or post-injury (wound or fracture) infections.
2. These infections may progress rapidly from minor to airway/life-threatening.

SIGNS AND SYMPTOMS:
1. Pain, fever and malaise
2. Intra/extra oral swelling
3. Difficulty opening mouth
4. Pus
5. Difficulty swallowing
6. Airway compromise

MANAGEMENT:
1. Manage airway and breathing first!
2. Place patient in position of comfort.
3. Monitor pulse oximetry.
4. Oxygen prn
5. IV access
6. Amoxicillin/clavulanic acid (Augmentin®) 875mg PO bid for 7 days **OR** ceftriaxone (Rocephin®) 1gm IV / IM qd for 7 days.
7. Treat per ***Pain Management Protocol (TMEP)***.
8. Consider dexamethasone (Decadron®) 10mg IV for any airway involvement.
9. **Avoid airway manipulation unless absolutely necessary**.
10. Have cricothyroidotomy kit available **BEFORE ATTEMPTING INTUBATION**.
11. If airway intervention is indicated, make a single attempt at intubation if feasible.
12. If intubation is attempted, do not make any repeat attempts. If intubation has failed, the next step is a cricothyroidotomy (using lidocaine if conscious)

DISPOSITION:
1. *Urgent* evacuation if any airway compromise is present.
2. *Routine* evacuation if no airway compromise and the infection is not widespread.

HEAT ILLNESS PROTOCOL

SPECIAL CONSIDERATIONS:
1. Dehydration often accompanies heat illness
2. Colloids (Hextend®) should be avoided in favor of crystalloids.
3. Heat Stroke is a life-threatening effect of hyperthermia and characterized by altered mental status and elevated core temperature typically > 104 °F.
4. Patients are at risk for multisystem organ failure, and careful monitoring is essential even after return to normothermia.

SIGNS AND SYMPTOMS:
1. Generally involve physical collapse or debilitation during or immediately following exertion in the heat.
2. Heat Exhaustion: Temp generally ≤ 104 °F, headache, dizziness, nausea, tachycardia, and normal mental status
3. Heat Stroke: Temp generally > 104 °F, above symptoms and altered mental status (delirium, stupor, coma).

MANAGEMENT:
1. Early rapid cooling reduces mortality and morbidity, and should be initiated as soon as possible. Cooling should be the primary goal before transport.
2. Place in cool area and remove clothing.
   a. For Heat Stroke:
      i. The best option for rapid cooling is full body ice water immersion (keeping head elevated out of water).
      ii. If this is unavailable, a continual dousing of cold water (as would occur in a cold shower or with ice water-soaked towels) provides the fastest cooling rate.
      iii. A less ideal option is to spray the patient with water plus rapid air movement provided by a fan.
   b. Apply these active cooling measures until the core temperature reaches 102 °F.
3. Place either 1 tube oral glucose gel (Glutose™) or 1 packet of sugar in buccal mucosa region.
4. Treat per ***Dehydration Protocol (TMEP)***.
   a. Heat stroke and heat exhaustion with associated severe muscle pain and/or cola colored urine will typically require 2-3 liters of crystalloid and continued IV hydration to obtain a urine output of 200mL/hr.
   b. If the patient is unconscious after exercising on a hot day, and you do not have a core temperature available, limit fluid resuscitation to 1000mL of crystalloid unless hemodynamically unstable.
5. Treat per ***Nausea and Vomiting Protocol (TMEP)***.
6.

For cola colored urine or severe muscle pain, treat per ***Rhabdomyolysis Protocol (TMEP)***.

DISPOSITION:
1. *Urgent* evacuation for Heat Stroke
2. *Routine* evacuation for Heat Exhaustion

HIV POST EXPOSURE PROPHYLAXIS PROTOCOL

SPECIAL CONSIDERATIONS:

1. Initiation of the highly active antiretroviral therapy (HAART) should ideally occur within 2 hours of exposure, but still has some effect up to 72 hours after exposure.
2. Antiretrovirals have a significant side-effect profile, including nausea, vomiting, and diarrhea.
3. Obtain a sample of the source's blood for HIV and hepatitis testing, if possible.
4. Use of a commercially available Rapid HIV Test Kit that uses either an oral specimen or whole blood is recommended for source testing to determine if HAART therapy should be initiated. This should occur within 1-2 hours. The test requires 20-40 minutes to obtain results. The use of one of the following FDA approved Rapid HIV Test kits is recommended (as of 2009):
   a. whole blood, plasma or oral fluid:
      i. OraQuick® Advance Rapid HIV 1/2 Antibody Test
   b. whole blood or serum/plasma:
      i. Uni-Gold™ Recombigen® HIV Test
      ii. Clearview® HIV 1/2 STAT-PAK®
      iii. Clearview® Complete HIV 1/2 Test

HIGH RISK EXPOSURES:

1. Percutaneous injury (needle stick or other contaminated penetrating injury).
2. Exposure or exchange of body fluids with persons at high risk for HIV.
3. Transfusion of blood products that have not undergone standard U.S. blood bank or equivalent testing for transmissible diseases.
4.

When attempting to evaluate a high risk exposure, take into account the source of the bodily contamination. For example, blood from a fellow service member would fall into a low risk category for exposure.

MANAGEMENT:

1. Wash area with soap and water to clean area and minimize exposure.

2. Use a Rapid HIV Test Kit to determine if therapy should be initiated. **In high risk situations, do not delay initiation of therapy if the test kit is not available. HIV PEP should be started within 1-2 hours of exposure.**

3. Consult with unit medical officer ASAP to discuss the case and obtain further guidance after any significant exposure.
   a. If the Rapid HIV Test is positive, initiate PEP.
   b. If high-risk exposure occurs and a Rapid HIV Test is unavailable, initiate PEP.
   c. If a Rapid HIV Test is negative, seek medical officer guidance to determine the need for PEP.
4.
Initiate antiretroviral triple therapy according to the following priority of drugs. **Choose only 1 of the following drug treatment options.**
   a. Atripla® (emtricitabine/tenofovir/efavirenz), 1 PO qd
      i.

52% incidence of CNS side-effects
      ii.

Known to cause birth defects. Category D drug. Be sure that a female patient has a negative pregnancy test prior to administration of Atripla® (emtricitabine/tenofovir/efavirenz).
   b. **OR** Combivir® (lamivudine and zidovudine) 1 tablet PO bid **AND** Viread® (tenofovir) 300mg PO qd
   c. **OR** Truvada® (emtricitabine/tenofovir) 1 PO qd **AND** Kaletra® (lopinavir/ritonavir) 4 pills PO qd, taken simultaneously

d. **OR** Truvada® (emtricitibine/tenofovir) 1 PO qd **AND** AZT (zidovudine(Retrovir®)) 300mg PO bid.

Possible antagonism with decreased effectiveness.

e. **OR** Combivir® (lamivudine and zidovudine) 1 tablet PO bid **AND** Viracept® (nelfinavir) 1250mg PO bid.

Older regimen. Replaced by options 4a and 4b.

5.

Do not use alcoholic beverages after Combivir® (lamivudine and zidovudine) administration.

6. For GI side-effects of medication, treat per ***Nausea and Vomiting Protocol (TMEP)***.

7. Maintain hydration and nutrition status.

DISPOSITION:

1. *Urgent* evacuation if a significant exposure occurs and HAART is not available.
2. *Routine* evacuation if HAART is available and Rapid HIV Test is positive.
3. Consult unit medical officer to determine the need for, and the priority of evacuation, if high-risk exposure has occurred and a Rapid HIV Test is negative.

INGROWN TOENAIL PROTOCOL

SPECIAL CONSIDERATIONS:

1. Consider toenail removal only if close follow-up is possible.
2. WARNING **DO NOT USE** local anesthetic with epinephrine.

SIGNS AND SYMPTOMS:

1. Pressure over the nail margins increases the pain.
2. Inflammatory or infectious responses are generally localized.
3. Partial or complete nail removal is typically indicated in chronic inflammation / infection, with severe pain of both medial and lateral nail folds, especially if the condition has lasted one month or greater.

MANAGEMENT:

1. Partial/complete toenail removal:
   a. Clean the site with soap, water, and betadine.
   b. Rx Perform a digital block at the base of the toe using lidocaine 1% **WITHOUT EPINEPHRINE.**
   c. Apply constricting band to base of toe.
   d. The lateral one fourth or one fifth of the nail plate is identified as the site for the partial lateral nail removal. This area is usually where the nail curves down into the toe. The physician uses a nail splitter or bandage scissors, cutting from the distal (free) end of the nail straight back (proximally) beneath the proximal nail fold *(Figures 1* and *2)*. A straight, smooth, new lateral edge to the nail plate is created. When the scissors cut through the most proximal edge of the nail beneath the cuticle, a "give" can be felt.

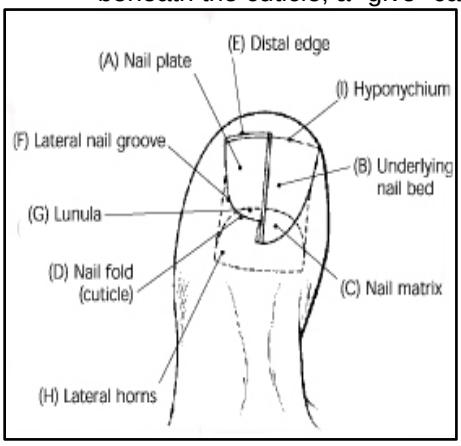


Figure 1

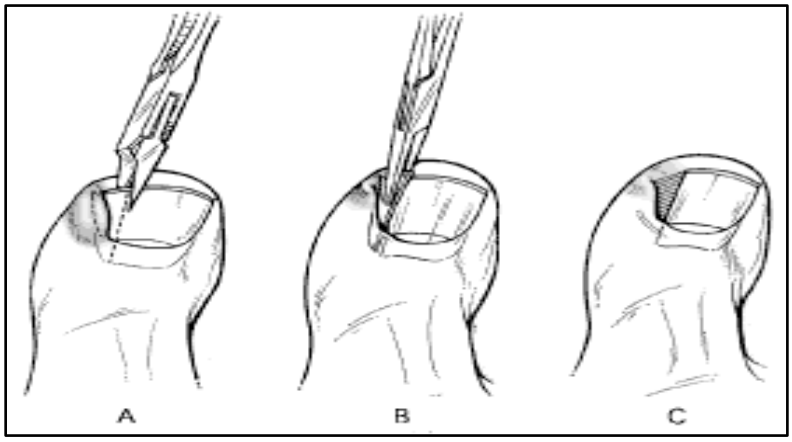


Figure 2: *Lateral nail avulsion.* (A) *An ingrown nail is seen with lateral nail fold hypertrophy on the left side of the nail. After administering digital or local anesthesia, scissors, a scalpel blade, or a nail splitter can be used to cut proximally and create a smooth, straight edge. Some physicians prefer to slide a flat nail elevator beneath the nail before making this cut in an effort to reduce trauma to the nail bed.* (B) *The free lateral nail now is grasped with a hemostat or clamp and removed.* (C) *The lateral nail bed and matrix are now exposed for ablation.*

e. Bluntly dissect the nail from the underlying matrix with a flat object, elevate the nail and grasp it with a hemostat or forceps, removing the piece. Remove the fragment by rotating outwards (towards the nail fold at the side of the nail), while pulling straight out towards the end of the toe. **Be sure that all of the nail fragment is removed**.
f. Clean the nail grooves to remove any debris.
g. Remove constricting band.
h. Control bleeding with direct pressure and dry the underlying nail bed.

2. Mupirocin (Bactroban®) 2% ointment to exposed nail bed.
3. Dress with a non-adherent dressing and dry bandage.
4. Instruct the patient to wash the area daily.
5. Recheck wound and change dressing daily.
6. Instruct patient to wear less constricting shoes and to trim their nails straight across. Optimal care is to limit walking and marching for 3-5 days.
7. Treat per ***Pain Management Protocol (TMEP)***.
8. Systemic antibiotics are typically not needed in these procedures; however, consider using moxifloxacin (Avelox®) 400mg PO qd for 10 days, **OR** amoxicillin/clavulanic acid (Augmentin®) 875mg PO bid for 10 days if an infection is suspected (increasing pain, redness, and swelling).

DISPOSITION:
1. Evacuation is usually not required if the condition responds to therapy.
2. The nail bed may have serous drainage for several weeks, but will usually heal within 2-4 weeks.

JOINT INFECTION PROTOCOL

SPECIAL CONSIDERATIONS:
1. May result from penetrating trauma (especially animal or human bites), gonorrhea, or iatrogenic causes (i.e., attempted aspiration of joint effusion).
2. Consider also an acute joint effusion due to blunt trauma or overuse (usually less red and no fever).

SIGNS AND SYMPTOMS:
1. History of adjacent penetrating trauma or infection
2. Single red, swollen joint
3. Fever
4. Pain
5.

Joint is swollen, with a tense effusion, and overlying erythema extending beyond the joint. Exam will most likely also have tender, swollen groin nodes in this patient with an infected knee joint.

MANAGEMENT:
1. IV access
2. Ceftriaxone (Rocephin®) 2gm IV / IM bid **OR** ertapenem (Invanz®) 1gm IV / IM qd**.**
3. Treat per ***Pain Management Protocol (TMEP)***.
4. If evacuation is prolonged and pain is unresponsive to analgesia, consider draining joint (if properly trained)
5. **IMMOBILIZE THE JOINT.**

DISPOSITION:
Priority evacuation

K-9 ANAPHYLACTIC REACTIONS AND ENVENOMATION PROTOCOL

SPECIAL CONSIDERATIONS:

1. Anaphylactic reactions in dogs most commonly occur in response to medications, insect bites or stings, and envenomation. Signs may range from mild to life threatening and can involve multiple organ systems including skin, eyes, respiratory tract, cardiovascular system, and gastrointestinal tract.
2. Envenomation from snake bites can cause multiple symptoms depending on the species of snake, size and age of the snake, and the location of the bite. Even though approximately 50% of bites are dry bites in which no venom is injected, all bites should be presumed to venomous as signs of envenomation may take hours to manifest. Delaying treatment could result in severe clinical signs and potentially death.

Allergic Reactions

SIGNS AND SYMPTOMS:

1. Mild Allergic Reactions
   a. Swelling of the muzzle and eyelid
   b. Redness around eyes and face
   c. Hives
   d. May see vomiting or diarrhea
2. Severe Allergic Reactions
   a. Same signs and symptoms as mild reactions
   b. Weakness, lethargy
   c. Respiratory distress due to bronchoconstriction
   d. Signs of shock
   e. Cardiovascular collapse as reaction progresses

MANAGEMENT:

1. Mild Allergic Reactions
   a. Remove all collars and choke chains from around the dog's neck if swelling is extensive.
   b. Diphenhydramine (Benadryl®) - Administer 1-2mg/kg SC, IM, or PO (capsules).
   c. Consider dexamethasone (Decadron®) 0.1mg/kg IV, IM, or SC - Not used in many cases, use judiciously
   d. Anti-emetics if indicated such as ondansetran (Zofran®) 0.1-0.2mg/kg IV or PO.
2. Severe Allergic Reactions
   a. Remove all collars and choke chains from around the dog's neck if swelling is extensive.
   b. Diphenhydramine (Benadryl®) - Administer 1-2mg/kg SC, IM.
   c. Epinephrine - 2.5-5mcg/kg IV or 10mcg/kg IM (EpiPen® can be used in typical 30kg dog)
   d. Consider dexamethasone (Decadron®) - 1-2mg/kg IV or IM - Not used in many cases, use judiciously
   e. Treat for shock. See ***K-9 Gastric Dilatation Volvulus (GDV) / Bloat Protocol (TMEP)***.

Envenomation

SIGNS AND SYMPTOMS:

1. Signs and symptoms include those described above for allergic reactions. Signs and symptoms will also depend on the type of venom. Those discussed below are a general rule, but there are some species of each that mimic the other species venom.

a. Viperidea (rattlesnakes, water moccasins, pit vipers, etc.): marked pain, swelling, and necrosis at the injury site as well as coagulopathies and cardiovascular collapse.
b. Elapidea (Cobra, Coral Snake, etc.): Venomous bites may result in progressive paralysis with death usually occurring from paralysis of the respiratory muscles.

MANAGEMENT:

1. Treat for anaphylaxis if necessary. Treat for shock. See ***K-9 Gastric Dilatation Volvulus (GDV) / Bloat Protocol (TMEP)***.
2. Treat pain with appropriate opioids (morphine, hydromorphone (Dilaudid®), or fentanyl), or NSAIDs as appropriate.
3. Immobilize affected limb (if extremity bite).
4. Evacuate for more definitive treatment and supportive care.
5. Antivenin may be given in a hospital setting - monitor for hypersensitivity reaction.
6. Plasma may be used if coagulopathies develop.

DISPOSITION:

1. *Urgent* evacuation if treated for anaphylaxis.
2. *Urgent* evacuation for Elapidae bites or if evidence of severe envenomation (systemic signs and symptoms, progressive ascending edema) exists.
3. Evacuation not required for Crotalinae bites if signs and symptoms do not indicate anaphylaxis or development of severe envenomation after four hours of observation.

K-9 EVALUATION AND TREATMENT PROTOCOL

VITAL SIGNS OF CANINES:

Parameter	Value	Parameter	Value
Pulse	60-120 bpm	HCT/PCV	37-55%
Respiration	8-24 bpm	SPO_2	95-100%
Temp	100-102.5 F	ET CO_2	35-45 mm Hg
CRT	<2 sec	Total Protein	5-7.5g/dl

1. Temperature:
   a. Normal Rectal Temp is 100-102.5 °F.
   b. Temperature after exercise: 103-106 °F. Temperature should return to normal within 15 minutes after completion of work.
2. Pulse
   a. Normal pulse rate will vary from 60-120bpm. Can beat up to 150 with exercise.
   b. The pulse rate and respiratory rate will vary from dog to dog, and will also vary if the dog is at rest or working.
   c. The femoral artery is located on the inside of a dog's rear thighs. Take your hand as if you were passing someone a plate, grab the dog on the front of their thigh with your fingers inside the thigh, and palpate the artery.
3. Normal respiratory rate for an adult dog will vary between 8-24 respirations per minute
4. Capillary refill time: less than 2 seconds.
5. Mucous membrane color: generally pink.

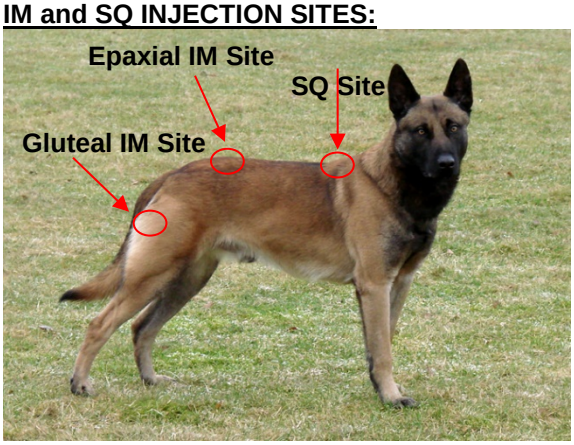
SECIFIC WEIGHT REALTED DRUG DOSES ARE AT THE END OF THE PROTOCOL.
MOST DOG HANDLERS WILL CARRY A DRUG CARD FOR THE DOG.

MONITORING:

1. Pulse Ox - Placed on tongue, ear, or other non-pigmented highly vascular area such as the lip, vulva, or prepuce.
2. EKG - Alligator clips behind each elbow and above left knee. If you do not have alligator clips place the buttons or leads behind the largest pad on the foot. Sticky pads can also be placed on the largest pad on the foot of the left and right forelimbs and the left hind limb.
3. Animals do not have palpable carotid pulses. You can obtain a femoral pulse in the inguinal crease.
4. End Tidal CO_2 - Measure the same way you do in human patients. Normal value 35-45mmHg.

Femoral Pulse Location:

IM and SQ INJECTION SITES:



IM Injections

1. Gluteal Site: palpate muscle belly between fingers. Insert needle into muscle; pull back on plunger to ensure no blood is present. Inject if no blood and reposition needle if blood is present.

2. Epaxial Site: Place hand on back with middle finger located on spine and thumb just in front of the pelvis. Muscle belly will be where your index finger naturally falls.

Subcutaneous Injections

Lift skin between the shoulder blades, insert needle at 45 degree angle.

IV SITES:

Usually the easiest/best vein to use for a K-9 IV is the one found on their forelegs. The cephalic vein is located on the middle of the foreleg. This is the most commonly used vein for fluid administration and IV delivery of drugs.

If the person occluding the vein for you rolls it laterally, this will place the vein directly on top of the dog's leg, easing access.

Maintain a firm hold on the dogs leg as you place the catheter, as they will pull away from you while placing the catheter.

Start distally on the vein. If you blow the vein, move more proximally and attempt the IV.

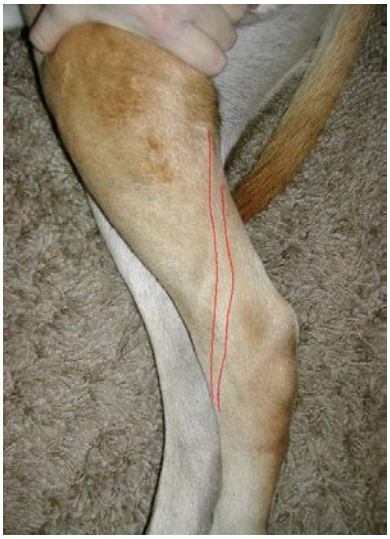
An 18-gauge 1 ½" catheter can be used in both the cephalic and the saphenous veins.

In the hind leg, the lateral saphenous vein is used. This vein is harder to maintain and secure.

In both procedures use plenty of tape to secure the IV line. Your patient will try to pull it out. If they are ambulatory, movement will often dislodge the IV. IVs in conscious dogs must be monitored.

Cephalic Vein

Saphenous Vein



HYDRATION STATUS:

1. Normal Hydration: Pick up skin and release. It should return to the original position within 1 second.
   a. Capillary Refill Time (CRT) is measured by pressing on the gums over the canine tooth. Using one finger, press down firmly until the gums turn white under your finger and release. Anything over two seconds is considered too long. Also, note the normal color of your dog's gums and mouth. Dog's gum color may vary from black, pink, brown or any combination of those colors.
2. Dehydration:
   a. 6-8% dehydration - loss of skin elasticity, tacky gums, mildly prolonged CRT
   b. 10-12% dehydration - tented skin, dry gums, prolonged CRT, sunken eyes, increased HR, rapid/weak pulses. Consider a 10-12% dehydration an emergency.
3. Dehydration Fluid Replacement
   a. Estimate dehydration
      i. 5% give 1000mL bolus IV
      ii. 10% give 1500mL bolus IV
   b. Fluid choice is normal saline or Lactated Ringer's Solution. Oral fluid consumption is the best way to prevent dehydration and it is important to offer water when rehydrating a dog.

RESTRAINT (SOF medical personnel should work with handler to learn muzzling techniques):

1. Always muzzle a dog when working on them.
2. Physical restraints with muzzles or improvised muzzles
   a. Field expedient muzzle:
      i. Kerlix® is wrapped around the snout several times and then tied behind the head.

      ii. The leash is wrapped around the snout and held tightly.

3. Chemical restraint if needed to protect handler and medic
   a. Dexmedetomidine (Dexdomitor®) (only use if nontraumatic injury) reversed with atipamezole (Antisedan®). After onset, dexmedetomidine (Dexdomitor®) gives 20-30 minutes of good sedation when administered with labeled dose.
   b. For mild sedation, a combination of midazolam (0.3mg/kg) plus ketamine (Ketalar®) (5mg/kg) can be administered IM or IV.

c. For deep sedation, a combination of Morphine (1mg/kg) plus midazolam (0.3mg/kg) plus ketamine (Ketalar®) (5mg/kg) can be administered IM. Hydromorphone (Dilaudid®) (0.1mg/kg) may be used in place of morphine.

DISPOSITION:
Evacuate as per applicable TMEP protocol.

K-9 GASTRIC DILATATION VOLVULUS (GDV) / BLOAT PROTOCOL

SPECIAL CONSIDERATIONS:

1. GDV is a rapidly life-threatening syndrome that is common in large-breed dogs. In this syndrome, the stomach rapidly dilates with air, food, or fluid, and then rotates/twists along the long axis. As the stomach dilates, there is compromised blood flow to the stomach and decreased venous return from the abdomen and pelvic limbs.
2. Most military working dogs have had a prophylactic gastropexy which is a surgical adhesion of the stomach to the body wall, preventing volvulus from occurring. Some working dogs, including contractor, coalition, and other working dogs, may not have had a gastopexy and are at high risk for GDV.

SIGNS AND SYMPTOMS:

1. Trying to vomit but not producing much; non-productive retching and gagging
2. Drooling
3. May or may not see distended abdomen depending on how early condition is identified
4. Dog is very painful, agitated, restless, painful on abdominal palpation
5. Shock - pale mucous membranes, poor pulse quality, shallow respirations

PROPHYLAXIS:

Prophylactic gastropexy may be performed prior to deployment by a military veterinarian.

MANAGEMENT:

1. External needle decompression using a 14-gauge catheter.
   a. May need to decompress several times if MEDEVAC/CASEVAC is delayed.
   b. Point of insertion for catheter for decompression is on the right lateral abdominal wall approximately 2 inches caudal to the last rib.
2. Treat for Shock.
   a. IV Fluid Therapy: Give ¼ of shock dose over 15-20 minutes and monitor dog's TPR and response to treatment. Continue to repeat ¼ dose every 15-20 minutes as needed while monitoring TPR and response to treatment. Shock dose is 90mL/kg/hr.
   b. Oxygen: Provide supplemental oxygen if available and necessary.
3. Evacuate for definitive surgery and management.
4. Early Treatment is the key to survival.

Site for bloat decompression

DISPOSITION:

Urgent evacuation for surgical treatment.

K-9 HEAT INJURIES PROTOCOL

SPECIAL CONSIDERATIONS:

1. Heat injuries are life threatening for an animal.
2. Dehydration accompanies heat injuries.
3. Crystalloids are preferred over colloids. However, use of colloids is better than nothing.
4. Panting is critical for body temperature maintenance. Consider removing the muzzle and vest to facilitate respiration or panting.

HEAT EXHAUSTION

SIGNS AND SYMPTOMS:

1. Recent activity and history,
2. Rectal temp maybe over 105 °F (40.5 °C)
3. Fast and shallow panting that does not slow in a couple of minutes or uncontrolled panting
4. Heart rate may be over 140 bpm
5. Brick red mucous membranes
6. Pulse may be bounding or thready and weak
7. Dog looking for a cool place to lay down or just stops working

HEAT STROKE

SIGNS AND SYMPTOMS:

1. Recent activity and history
2. Rectal Temp over 106 °F (41.1 °C)
3. Pale gums
4. Rapid and shallow breathing
5. Collapse
6. Weak
7. Uncoordinated
8. Seizures
9. Vomiting
10. Diarrhea

MANAGEMENT:

1. Move dog to shade or AC
2. Remove muzzle and vest if dog is wearing one
3. Wet down or submerge in cool water. If possible fan dog afterwards.

Do not put a wet dog in the kennel. This will create a sauna like effect upon the dog.

4. Alcohol on foot pads
5. IV fluid therapy: Give ¼ of shock dose over 15-20 minutes and monitor dog's TPR and response to treatment. Continue to repeat ¼ dose every 15-20 minutes as needed while monitoring TPR and response to treatment.
   a. Shock Dose is 90mL/kg/hr.
6. Discontinue interventions at a rectal temperature of 103 °F (39.4 °C) and continue monitoring.

DISPOSITION:

4. *Urgent* evacuation for heat stroke patients or heat exhaustion patients not responding to treatment
1. Mild heat stress and mild heat exhaustion patients can be treated on site, but should be evacuated if condition worsens.
2. Avoid working the dog and rigorous activity for 3 days to allow time for dog to recover.

K-9 HIGH ALTITUDE SICKNESS AND PULMONARY EDEMA PROTOCOL

SPECIAL CONSIDERATIONS:
Typically not seen in dogs, but may occur

SIGNS AND SYMPTOMS:
1. Reduced appetite
2. Listlessness
3. Reduced activity levels
4. "Mildly dusky" tongue color/pale gums
5. Brown or pink tinted fluids from mouth or nose
6. Lung sounds (fluid in lungs)

PROPHYLAXIS:
1. Acetazolamide (Diamox®) 250mg PO bid 24 hours prior to ascent and continued for 48 hours after maximum altitude is reached.
2. If the 500mg sustained release tablet is used, dose is 500mg PO every 24 hours.

TREATMENT:
1. Descend from altitude and treat symptoms
2. Oxygen
   a. Example of blow by oxygen administration

   b. Alternatively connect the O_2 line to the bars of a cage or kennel and cover the cage with a poncho, rain coat, etc.
3. Dexamethasone (Decadron®), 4mg IV / IM/ PO q 6hr
4. Albuterol (Ventolin®) inhaler can be attempted
   a. Apply field expedient muzzle as shown.
   b. Improvise a nebulizer by using a plastic bag or paper bag. Open the bag, squirt the albuterol (Ventolin®) into the bag. Place the bag over the muzzle and let the dog breath a few breaths from the bag.

DISPOSITION:
1. *Priority* evacuation for any K-9 AMS
2. *Urgent* evacuation for any K-9 with suspected HACE or HAPE.
3. Any K-9 that has recovered from HACE or HAPE should not re-ascend without veterinarian medical officer clearance.

K-9 TRAUMA MANAGEMENT PROTOCOL

SPECIAL CONSIDERATIONS:
1. Control bleeding first based on K9-TCCC standards and guidance for humans.
2. Follow K9 **M²ARCH²E** protocol

SIGNS AND SYMPTOMS:

for Shock:
1. Pale gums, capillary refill time greater than 2 seconds
2. Dry lips and gums, dehydration
3. Excessive drooling in some poisoning cases
4. Weak femoral pulse
5. Rapid heart rate of 150-200 beats per minute
6. Cool extremities
7. Hyperventilation, rapid breathing generally over 25 breaths per minute (panting may or may not be normal)
8. Confusion, restless, anxiousness
9. General weakness

for advanced stages of shock:
1. Continued depression and weakness to the point of not being able to move or becoming unresponsive or unconscious
2. Dilated pupils
3. Capillary refill time greater than 4 seconds
4. White mucous membranes
5. Rectal temperature below 98 °F (37 °C).

MANAGEMENT:
1. **MARCHE** Protocol
2. **Muzzle, M**assive hemorrhage: Control bleeding per TCCC standards, Morphine
   a. Muzzle: Do not apply a muzzle if dog is in respiratory distress.
   b. Massive hemorrhage: Control bleeding with direct pressure and pressure dressings. Tourniquets are not as effective in dogs due to anatomical differences. All hemostatic agents used in humans are safe for use in dogs.
   c. Morphine: 10-30mg IM. May cause vomiting and respiratory depression. Use naloxone (Narcan®) (0.02mg/kg) for reversal if necessary.
3. **A**irway
   a. An injured dog or an animal in shock may not recognize you. The dog may bite you out of pain or fear. If the dog is having trouble breathing or panting heavily, **DO NOT** apply a muzzle. If a muzzle is placed on the dog it must be monitored at all times and removed at the first sign of overheating or vomiting because they can easily aspirate. Get help if possible from someone who can help hold the dog, so you can do an examination and/or treat the dog.
      i. Carefully pull the tongue out of the animal's mouth.
      ii.

Even an unresponsive dog may bite by instinct!!
      iii. Make sure that the neck is reasonably straight; try to bring the head in-line with the neck.
      iv.

Do not hyperextend in cases where neck trauma exists
   b. Intubation or tracheostomy if necessary to secure airway

Do not attempt to intubate or perform a tracheostomy on a conscious animal, personnel must have prior training. ET tube size can range from 7-10.

c. If intubation is not possible, then attempt tracheostomy.
d. After achieving a patent airway, one must determine whether the animal is breathing, and whether this breathing is effective.
e. **AIRWAY CONSIDERATIONS:**
   i. Size 7mm to 10mm cuffed endotracheal tube, secure with gauze or IV tubing. Tie over nose.
   ii. Blow by oxygen - secure airline to muzzle.
   iii. Field expedient O_2 masks.
   iv. Nasal trumpets are ineffective in canines

4. **R**espiration
   a. Look, Listen, and Feel
   b. If not breathing, ventilate the animal by closing the mouth, and performing mouth-to-nose ventilations. If patient is intubated or has tracheostomy, ventilate the animal using a BVM.
   c. Ventilate at 20 breaths per minute.
   d. If available, use supplemental oxygen
   e. Chest seal: Human chest seals can be used in canines, but their haircoat makes achieving an airtight seal difficult. Additional bandaging may be necessary to hold chest seal in place. HALO chest seals or plastic wrapping material applied with sterile lube and tape are recommended.

   f. Needle thoracentesis: Place the dog in the lateral recumbent position, go midway between sternum and spine between the 7th and 9th ribs. Use a 14G 3.25in needle. Perform needle decompression on both sides.
5. **C**irculation
   a. Be sure that there are no major (pooling/spurting blood) points of bleeding. Control as necessary.
   b. Hemorrhagic Shock Fluid Resuscitation (Administration Routes):
      i. Primary route is IV
      ii. Secondary route is IO (Tibia or Humerus) on a sedate or unconscious dog only.
   c. Incorporate crystalloids and colloids as needed
      i. Bolus of crystalloid, 10-20mL/kg, reassess and repeat a maximum of 2 times
      ii. Bolus of colloid, 5-10mL/kg given once over 20-30 minutes.
   d. The targeted endpoint for resuscitation should be to achieve and maintain permissive hypotension.
   e. Blood transfusion (dog-to-dog), if available.
      i. For the first transfusion in a trauma/field situation it is generally safe to give any type of blood without typing or cross-matching.
      ii. Collect no more than 20% blood volume (collect 1 unit/450mL from typical size working dog). Perform a sterile prep and use the jugular vein for collection.
      iii. In a trauma/field situation you will usually administer the whole unit. Human blood transfusion guidelines apply for rate and monitoring requirements.

IO Access Site - Proximomedial Tibia

6. Hypothermia, Head injury:
   a. **H**ypothermia: Prevent loss of body heat. Dry the fur. Use a hypothermia blanket. Watch for overheating.
   b. Head Injury: Head trauma from blunt or penetrating injury can cause rises in intracranial pressure (ICP) in most patients with CNS trauma usually as a result of braid edema and intracranial hemorrhage. Signs of shock, hypoxia, seizures, and other neurologic signs (i.e. ataxia, altered mentation, loss of consciousness, pupil asymmetry) may also be seen.

i. Elevate head 30º and avoid jugular occlusion, maintain head neutral neck position.
ii. Supplemental oxygen, if available. Intubation and hyperventilation may be necessary in cases of hypoxia.
iii. Mannitol 0.5 -1.0 g/kg IV over 20 minutes, repeat q4-8 hours based on neurologic status, limit to 3 doses in a 24 hour period
iv. IV fluids: goal is to maintain cerebral perfusion by optimizing MAP without causing increased ICP
    1). Crystalloid: 10-20 ml/kg IV bolus, reassess and repeat a maximum of 2 times, can be combined with colloids
    2). Colloid: 5-10 ml/kg IV bolus over 10-15 minutes for acute trauma resuscitation
v. Control seizures with one of the following:
    1). Diazepam (Valium): 15-30mg IV or per rectum bolus for a standard 30kg dog (dose is 0.5-1mg/kg). Repeat as necessary to a maximum of 3 doses over 5-10 minute intervals.
    2). OR Midazolam: Give 0.3mg/kg IV for a maximum of 2-3 doses over 5-10 minute intervals
vi. Prevent and manage hypothermia

7. **E**vacuation and **E**verything **E**lse
    a. Tranexamic acid (TXA) (Cyklokapron®) - Administer 10-15mL/kg IM or slowly IV
    b. Analgesia
        i. Morphine: Administer 0.5-1mg/kg IM or IV, may cause vomiting
        ii. Hydromorphone (Dilaudid®): Administer 0.1-0.2mg/kg IM or IV, may cause vomiting
        iii. Fentanyl: Administer 3-4mcg/kg IV; Can also use an oral transmucosal fentanyl citrate (Actiq®) lozenge 800-1600mcg inserted in the rectum secured with tape to the tail base
        iv. Naloxone (Narcan®): Opiod reversal , administer at 0.02-0.04mg/kg IV, IM, or SQ
    c. Antibiotic Therapy for Penetrating Wounds
        i. Ceftriaxone (Rocephin®) 1gm IV / IM daily
        ii. Ertapenem (Invanz®) 500mg IV / IM two times a day

DISPOSITION:
Urgent evacuation for treatment and supportive care.

K-9 RDX (C-4) INGESTION

SIGNS AND SYMPTOMS:

1. Tonic-clonic convulsions
2. Coma
3. Lethargy
4. Confusion
5. Muscle spasms
6. Nausea / vomiting
7. Abdominal tenderness
8. Cardiac arrhythmias

TREATMENT:

1. If recognized immediately after ingestion, induce vomiting (prior to the occurrence of clinical signs) with one of the following:
   a. Morphine: 10-30 mg given IM or IV
   b. Hydrogen peroxide: 30mL orally. Repeat dose in 15 minutes if patient does not vomit. Be aware of possible oxidative concerns with this depending on training aid ingested.
   c. Apomorphine (Apokyn®): Place 0.25mg tablet in the conjunctival sac. Once patient vomits remove any tablet that is left and flush eye with large amounts of saline.
2. Control seizures with one of the following:
   a. Diazepam (Valium®): 15-30mg IV or per rectum bolus for a standard 30kg dog (dose is 0.5-1mg/kg). Repeat as necessary to a maximum of 3 doses over 5-10 minute intervals.
   b. OR midazolam: Give 0.3mg/kg IV for a maximum of 2-3 doses over 5-10 minute intervals.
3.

Ipecac syrup is contraindicated in the treatment of K-9 toxic ingestion.
4. If you have time during evacuation, initiate IV fluids.

DISPOSITION:
Urgent evacuation to veterinarian immediately for follow up or supportive care.

LOSS OF CONSCIOUSNESS (WITHOUT SEIZURES) PROTOCOL

SPECIAL CONSIDERATIONS:

1. The most common cause of loss of consciousness in healthy adults is orthostatic hypotension (associated with sudden standing) or vasovagal syncope (associated with sudden adverse stimulus - injections are a common cause).
2. Also consider hypoglycemia, anaphylactic reaction, medication, recreational drug use, head trauma, hyperthermia, hypothermia, myocardial infarction, lightning strikes, and intracranial bleeding.

SIGNS AND SYMPTOMS:

Unconsciousness

MANAGEMENT:

1. Follow BLS guidelines.
2. Management of orthostatic hypotension and vasovagal syncope is accomplished by placing the patient in a supine position, ensuring the airway is open. Patients experiencing these two disorders should regain consciousness within a few seconds. If they don't, consider other etiologies and proceed to the steps below.
3. Pulse oximetry monitoring.
4. Oxygen.
5. Place either 1 tube oral glucose gel (Glutose™) or 1 packet of sugar in buccal mucosa region.
6. Consider IV access.
7. Naloxone (Narcan®) 0.8mg IV / IM. Repeat q 2-3 min prn to max dose of 10mg ***if opiate use is suspected***.
8. If no response treat per appropriate Protocol per Special Consideration #2.

DISPOSITION:

1. *Urgent* evacuation, unless loss of consciousness due to orthostatic hypotension or vasovagal hypotension.
2. The evacuation package should include personnel certified in Advanced Cardiac Life Support (ACLS), with equipment, supplies and medications necessary for ACLS care.

MALARIA PROTOCOL

SPECIAL CONSIDERATIONS:

1. Malaria MUST be considered in all febrile patients currently in, or recently in, a malarious area.
2. It is not uncommon for malaria to present like pneumonia or gastroenteritis (with vomiting and diarrhea).
3. The use of chemoprophylaxis does not rule out malaria.
4. Consider bacterial meningitis in evaluating - treat for both disorders if meningitis is suspected.

SIGNS AND SYMPTOMS:

1. Prodrome of malaise, fatigue, and myalgia may precede febrile paroxysm by several days.
2. Paroxysm characterized by abrupt onset of fever, chills, rigors, profuse sweats, headache, backache, myalgia, abdominal pain, nausea, vomiting, and diarrhea (may be watery and profuse) in *P. falciparum.*
3. Intermittent fever to >105 °F (40 °C) OR fever may be near continuous in *P. falciparum* malaria; classic "periodicity" is usually absent. Profuse sweating between febrile paroxysms.
4. Tachycardia, orthostatic hypotension, tender hepatomegaly, and delirium (Cerebral malaria).

MANAGEMENT:

1. Atovaquone 250mg/proguanil 100mg (Malarone®) 4 tabs qd for 3 days with food **PLUS** primaquine 30mg qd for 14 days (**MUST** rule out G6PD deficiency before giving primaquine).
2. Acetaminophen (Tylenol®) 1000mg PO q 6hr prn for fever.

DISPOSITION:

1. *Urgent* treatment and evacuation for complicated malaria (cerebral, pulmonary, unstable vital signs). These indicate a medical emergency.
2. *Routine* evacuation for uncomplicated cases (normal vital signs, normal mental status, tolerates PO, no cough/ shortness of breath).

MENINGITIS PROTOCOL

SPECIAL CONSIDERATIONS:
1. May be bacterial, viral, or fungal. The bacterial type may cause death in hours, even in previously healthy young adults, if not treated aggressively with appropriate antibiotics.
2. Consider malaria as a differential diagnosis. Treat for both if malaria cannot be ruled out.

SIGNS AND SYMPTOMS:
1. Classic features include:
   a. Severe headache
   b. High fever
   c. Pain with any neck movement, particularly forward flexion
   d. Altered mental status
2. May also include:
   a. Photophobia
   b. Nausea and vomiting
   c. Malaise
   d. Seizures
3. Positive Brudzinski's (pain with head and neck flexion) and Kernig's (neck pain with hip flexion and knee extension) signs

MANAGEMENT:
1. If meningitis is suspected, treatment should be initiated immediately.
2. IV access.
3. Dexamethasone (Decadron®) 10mg IV / IM q 6hr.
4. Ceftriaxone (Rocephin®) 2gm IV q 12hr (IM route possible alternative but prefer IV route).
5. Treat per ***Pain Management Protocol (TMEP)***.
6. Treat per ***Nausea and Vomiting Protocol (TMEP)***.
7. If seizures occur, treat per ***Seizure Protocol (TMEP)***.
8. Moxifloxacin (Avelox®) 400mg PO once **OR** ceftriaxone (Rocephin®) 250mg IM for prophylaxis of close contacts.

DISPOSITION:
Urgent evacuation

NAUSEA AND VOMITING PROTOCOL

SPECIAL CONSIDERATIONS:
1. Avoid rapid IV administration of promethazine (Phenergan®)
2. **DO NOT** give subcutaneous promethazine (Phenergan®)
3. Diphenhydramine (Benadryl®) and promethazine (Phenergan®) may cause drowsiness.

SIGNS AND SYMPTOMS:
Nausea and Vomiting

MANAGEMENT:
1. Ondansetron (Zofran®) 4-8mg IV / IM bid or 8mg PO q 8hr prn.
2. **OR** promethazine (Phenergan®) 25mg IV / IM / PO q 6hr prn.
3. **OR** diphenhydramine (Benadryl®) 25-50mg IV / IM / PO q 6hr prn (may be useful for vertigo or motion sickness).
4. Treat per ***Dehydration Protocol (TMEP)***.

DISPOSITION:
Evacuate per Protocol for underlying condition.

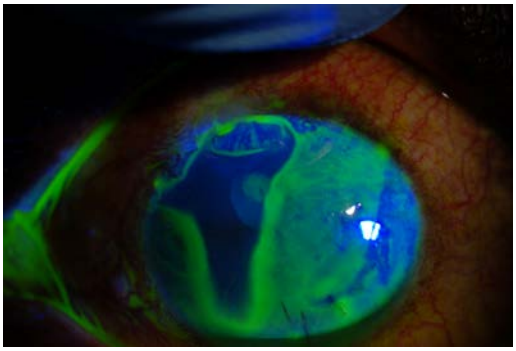
OPEN GLOBE INJURY PROTOCOL

SPECIAL CONSIDERATIONS:
1. High index of suspicion is essential for OGI.
2. Prognosis for visual acuity best if surgery performed within 24 hours of injury.

SIGNS AND SYMPTOMS:
1. History of blunt or sharp trauma to ocular region
2. Risk increased with concurrent penetrating periocular or head trauma
3. Suspicious findings: Peaked pupil, abnormal anterior chamber depth, 360° subconjunctival hemorrhage
4. Definitive findings: obvious laceration/rupture, prolapsed intraocular contents
5. Visual acuity usually decreased, but may be close to normal with small lacerations
6. Afferent pupillary defect
7. Positive Seidel test (see below)

MANAGEMENT:
1. Rigid eye shield (no gauze/padding) to prevent further injury; NO PRESSURE ON EYE.
2. Do not instill topical medications if suspicious for OGI.
3. Use of ultrasound **contraindicated** in suspected OGI.
4. Ondansetron (Zofran®) 4mg IM or 4mg IV over 2-5 min.
5. Moxifloxacin (Avelox®) 400mg PO/IV (repeat q day for delayed evacuation) for prevention of intraocular infection (endophthalmitis). Give ertapenem (Invanz®) 1 g IV/IM once a day if IV moxifloxacin not available.
6. Treat per ***Pain Management Protocol (TMEP)****;* ketamine cleared for use.
7. Maintain patient comfort and supine/head elevated positioning.
8. No altitude restrictions for suspected OGI.

DISPOSITION:
1. *Urgent* evacuation
2. Consider teleconsultation with photos if evacuation delayed.
3. Add clindamycin 300mg IV q 8 hours for delayed evacuation.



Positive Seidel Test

Seidel Test

Materials: Fluorescein strip, cobalt blue light source

Considerations:

DO NOT PUT PRESSURE ON GLOBE; this may cause extrusion of intraocular contents and loss of salvageable vision.

Limitations:

Negative test DOES NOT rule out OGI; wound may be plugged with iris or vitreous.

Procedure:
1. Moisten fluorescein strip with saline
2. Gently touch to suspicious area; concentrated fluorescein will remain orange
3. Using Cobalt light, observe for streaming of green/dilution of fluorescein
4. Note location on casualty card

PAIN MANAGEMENT PROTOCOL

SPECIAL CONSIDERATIONS:
1. Any use of narcotic medications will be sedating and degrade the mission performance of patients.
2. Avoid IM or SQ injections of narcotic medications due to the potential for delayed absorption.

SIGNS AND SYMPTOMS:
Pain

MANAGEMENT:
1. Start in sequential manner to maximize pain control with mission performance.
   a. Mild analgesic.
      i. Acetaminophen (Tylenol®) 1000mg PO q 6hr prn. (Mild to moderate pain-patient is still able to perform.)
      ii. **OR** Acetaminophen (Tylenol®) 650 mg bilayer caplet, 2 PO every 8 hours (found in the TCCC Combat Wound Medication Pack (CWMP))
   b. Non-steroidal anti-inflammatory drugs. (Mild to moderate pain-patient is still able to perform.)
      i. Meloxicam (Mobic®) 15mg PO qd prn (found in the TCCC Combat Wound Medication Pack (CWMP))
      ii. **OR** ibuprofen (Motrin®) 800mg PO q 8hr prn
      iii. **OR** ketorolac (Toradol®) 30mg IV q6hr prn, not to exceed 120 mg/day
      iv. **OR** ketorolac (Toradol®) 60 mg IM single dose or 30 mg q6hr prn; not to exceed 120 mg/day
   c. Narcotic Medications (Moderate to severe pain. Consider disarming the patient.)
      i. Oral transmucosal fentanyl citrate (Actiq®) lozenge 800mcg orally over 15 minutes (may repeat dose once)

      Life-threatening hypoventilation/ respiratory arrest could occur at any dose of fentanyl, particularly in patients not taking chronic narcotics. Therefore, closely monitor for respiratory depression.
      ii. **OR** morphine sulfate 5mg IV initial dose then 5mg IV q 10 min for max dose of 30mg. Repeat as necessary q 30-60 minutes.
   d. Disassociative anesthetic (Moderate to severe pain. Disarm the patient!)

      STOP IV administration once pain control has been achieved or if dissociative effects or nystagmus (rhythmic back-and-forth movement of the eyes) noted.

      i. Ketamine (Ketalar®) 50mg IM in large muscle site (1mL total if concentration 50mg/mL; ensure proper dilution). Repeat q30min unless dissociative effects or nystagmus noted, then discontinue.

      IV/IO ketamine (Ketalar®) must be diluted to a concentration of 50mg/ml or lower. Barbiturates and diazepam should NOT be mixed in the same syringe with ketamine.
      NOTE: If sedatives, opioids, or other adjuvant drugs (e.g., midazolam, fentanyl) have been given, ketamine will normally be effective at smaller doses.

ii. **OR** ketamine (Ketalar®) 20mg slow IV or IO once over 1 minute (0.4mL total if concentration equals 50mg/ml; ensure dilution).

iii. Consider midazolam 0.03mg/kg IN/IV/IO (2-3mg for adults) as adjunct to ketamine (Ketalar®) sedation.

2. Treat per ***Nausea and Vomiting Protocol (TMEP)*** prn.

DISPOSITION:
1. Consider underlying cause to determine evacuation priority.
2. Patients receiving opiates or ketamine should most likely be evacuated.

PNEUMOTHORAX - ACUTE (ATRAUMATIC) PROTOCOL

SPECIAL CONSIDERATIONS:
1. Consider also: anaphylaxis, pulmonary embolism, high altitude pulmonary edema (HAPE), asthma, myocardial infarction and pneumonia.
2. More common in tall, thin individuals and smokers.

SIGNS AND SYMPTOMS:
1. Acute, unilateral chest pain
2. Dyspnea - typically mild
3. No wheezing
4. Decreased or absent breath sounds on affected side

MANAGEMENT:
1. Pulse oximetry monitoring
2. Oxygen (use oxygen for all suspected acute pneumothoraces)
3. Consider needle decompression for suspected tension pneumothorax.
4. If needle decompression shows immediate patient improvement, followed by worsening of condition, consider repeat needle decompression.
5. Consider tube thoracostomy:
   a. Recurrence of respiratory distress after 2 successful needle decompressions
   b. Evacuation time > 1hr with continued respiratory distress.
   c. Patient requires positive pressure ventilation
6. If at altitude, descend as far as tactically feasible.
7. If evacuation will occur in an unpressurized aircraft, consider decompression for high altitude evacuation and recommend lowest tactically feasible altitude
8. Treat per ***Pain Management Protocol (TMEP)***.

DISPOSITION:
1. *Urgent* evacuation for significant respiratory distress despite therapy.
2. *Priority* evacuation for patients whose respiratory status is stable.

RHABDOMYOLYSIS PROTOCOL

SPECIAL CONSIDERATIONS:
1. Aggressive hydration is the cornerstone of treatment.
2. Causes: Limb ischemia, Carbon Monoxide Poisoning, Electrical or thermal burns, Blunt trauma or Crush injury, Snake Bite, Hyperthermia, Hypothermia, Physical Exertion

SIGNS AND SYMPTOMS:
1. Acute muscle pain (myalgias)
2. Muscle Weakness
3. Fever
4. Malaise
5. Nausea or Vomiting
6. Tea-colored urine
7. Oliguria/Anuria
8. Dipstick positive for blood, but no intact RBC on a spun specimen

MANAGEMENT:

1. Crystalloid 1-2L bolus IV/IO followed by 500mL - 1L/hr.
   a. Maintain urine output at greater than or equal to 200mL/hr. If possible, insert Foley catheter.
   b. Consider urinary alkalinization to achieve urine pH > 6.5
      i. Mix sodium bicarbonate 40mEq (1 ampule/bristojet) in 500mL normal saline.
      ii. Run at 100mL/hr.
2. Reassess vital signs and mental status frequently
3. Utilize Propaq® or AED cardiac monitoring if available.
4. Potential Problems / Complications
   a. Monitor for signs and symptoms of hyperkalemia (cardiac dysrhythmia) - administer 1gm calcium and 40mEq sodium bicarbonate (1 ampule) IV/IO

   Calcium should not be given in bicarbonate containing solutions due to precipitation of calcium carbonate.

   Calcium chloride should be given SLOW IV push to prevent vein necrosis.
   Persistent oliguria despite adequate fluid resuscitation
   b. Hypocalcemia (provoked by sodium bicarbonate) - perioral tingling, muscle tetany, increased deep tendon reflexes, QT prolongation on cardiac monitor - stop sodium bicarbonate infusion
   c. Avoid loop diuretics such as furosemide (Lasix®), which may increase myoglobin precipitation in kidneys and provoke acute renal failure
   d. Compartment syndrome - see ***Tactical Trauma Protocols***

References:

1. Marx in Rosen (2002). *Emergency Medicine*. 1762-70.
2. Sauret (2002). *Am Fam Physician*. 65 (5): 907-12.
3. http://www.fpnotebook.com/Renal/Failure/Rhbdmylys.htm
4. http://emedicine.medscape.com/article/827738-treatment.

DISPOSITION:
Urgent evacuation

SEIZURE PROTOCOL

SPECIAL CONSIDERATIONS:
1. May be caused by injury, infection, high fever, alcohol withdrawal, drug use, toxins, and structural abnormalities of the central nervous system (CNS).
2. Possible history of previous seizures, recent head trauma, CNS infection, or headaches

SIGNS AND SYMPTOMS:
1. Involuntary repetitive muscle movements that are abrupt in onset
2. Associated unresponsiveness
3. Typically lasts 90-120 seconds.
4. Followed by period of confusion and somnolence (postictal state)
5. Evidence of recent seizure activity may include urinary incontinence and acute intraoral trauma (e.g.: tongue biting)

MANAGEMENT:
1. Avoid trauma to patient during the seizure, but do not restrain patient.
2. Diazepam (Valium®) 5-10mg IV/IO q 5 min or 10mg IM q 15 min to a maximum dose of 20mg.

   OR midazolam 5mg IV/IO q 5 min or 5-10mg IM q 15 min (no maximum dose)
3. Fosphenytoin (Cerebyx®) 20 phenytoin (Dilantin®) equivalents (PE) PER KILOGRAM (PE/kg) IV/IO at 100-150mgPE/min if available for seizures refractory to benzodiazepines.

   WARNING **Fosphenytoin (Cerebyx®) is typically administered in phenytoin (Dilantin®) equivalents (PE) per kilogram, rather than mg/kg. Ensure you properly calculate the dosage. The normal concentration of phenytoin (Dilantin®) is 1.5mg of phenytoin (Dilantin®) per 1PE. e.g. 500mg PE in 10mL for a total of 750mg phenytoin.**

   WARNING **Do not administer fosphenytoin (Cerebyx®) faster than 150 mg/min since this may result in hypotension.**
4. Do not attempt to force an object into the mouth to open airway.
5. Support and maintain airway and ventilation as needed to include SPO_2.
6. If seizures are accompanied by fever,
   a. Consider meningitis and treat per ***Meningitis Protocol (TMEP)***.
   b. Consider malaria if in malaria endemic area and treat per ***Malaria Protocol (TMEP)***.
7. If nerve agent, both atropine (shortly after exposure) and diazepam/midazolam are critical for stopping the seizure. See ***CBRN: Nerve Agent Poisoning Protocol (TMEP)***.

DISPOSITION:
Urgent evacuation

SEPSIS / SEPTIC SHOCK PROTOCOL

SPECIAL CONSIDERATIONS:
1. Sepsis is a severe, life-threatening bacterial blood infection.
2. Rapid onset - death may occur within 4-6 hours without antibiotic therapy.

SIGNS AND SYMPTOMS:
1. Hypotension
2. Fever
3. Tachycardia
4. Altered mental status
5. Dyspnea
6. May see skin rash (purpura or petechiae)

MANAGEMENT:
1. Obtain IV/ IO access.
2. Ertapenem (Invanz®) 1gm IV / IO qd **OR** ceftriaxone (Rocephin®) 2gm IV / IO.

3. If patient is hypotensive, give 1L normal saline or Ringer's lactate fluid bolus.
   a. Consider additional fluids if still hypotensive, then an additional liter titrated to maintain systolic blood pressure >90mmHg or palpable radial pulse.
   b. Hextend®500mL IV boluses may be used (if crystalloids are unavailable) to maintain palpable radial pulse of systolic BP of 90mmHg.
4. Push dose IV epinephrine for persistent hypotension after fluid bolus.

   DO NOT GIVE UNDILUTED (1:1,000) EPINEPHRINE INTRAVENOUSLY.
   a. Take a 10mL syringe and draw up 1mL of 1:1,000 epinephrine.
   b. Then draw up 9mL of Normal Saline into this syringe.
   c. Waste 9mL of this mixture, then draw up 9mL more of normal saline into the same syringe.
   d. Final concentration is 10mL of 1:100,000 epinephrine, 10mcg/mL.
   e. Administer 0.5-2mL (5-20mcg) IV/IO to maintain radial pulse or SBP > 90mmHg.
5. Dexamethasone (Decadron®) 10mg IV if persistent hypotension after fluid bolus and epinephrine.

6. Monitor for decreased mental status and be prepared to manage airway.

DISPOSITION:
Urgent evacuation

SMOKE INHALATION / CHOKING AGENT / TOXIC INDUSTRIAL CHEMICALS (TICs) PROTOCOL

SPECIAL CONSIDERATIONS:

1. Consider possible carbon monoxide (CO) poisoning and need for hyperbaric oxygen in all significant cases of smoke inhalation.
2. Normal oxygen saturation by pulse oximetry DOES NOT rule out the possibility of CO poisoning.
3. Burns to the upper airway may not be immediately obvious. Strong consideration should be given to early airway intervention if upper airway burns are suspected or edema is present.
4. Choking agents/TICs cause immediate>>delayed symptoms (ammonia>>chlorine>>phosgene).

SIGNS AND SYMPTOMS:

1. History of exposure
2. Burns
3. 2.3. Eyes. See ***Corneal Abrasions/Ulcer/Conjunctivitis Protocol (TMEP)***, nose, throat, and skin irritation
4. Coughing
5. Respiratory distress to include wheezing and pulmonary edema (may be delayed in onset)

MANAGEMENT:

1. Administer oxygen.
2. Consider the use of early intubation or cricothyroidotomy if airway burns/ edema or singed nasal hair, facial burns are present/ suspected. High PEEP may be required.
3. Albuterol (Ventolin®) by metered dose inhaler 2-4 puffs q4-6hr.
4. Dexamethasone (Decadron®) 10mg IV / IM qd.
5. Limit patient exertion if possible (worsens prognosis in chemical exposures).
6. Observe asymptomatic choking agent/TIC exposures for delayed onset of symptoms (12-24hours).

DISPOSITION:

1. *Urgent* evacuation for respiratory distress, suspected inhalation burns.
2. *Priority* evacuation if not in distress but significant inhalation suspected.

SUBUNGUAL HEMATOMA PROTOCOL

SPECIAL CONSIDERATIONS:
None

SIGNS AND SYMPTOMS:
1. Pain from the affected nail
2. Purplish-black discoloration under the nail

MANAGEMENT:
1. Decompress the nail with a large gauge needle by rotating needle through the nail directly over the discolored area until the underlying blood has been released and the pressure is relieved. Make sure that it is introduced into the affected nail with a gentle but sustained rotating motion.
2. Gentle pressure on the affected nail may help to evacuate more blood.
3. Treat per ***Pain Management Protocol (TMEP)***.
4. If a fracture is suspected, tape the injured finger or toe to an adjacent digit.
5. If fracture is suspected in a setting of a subungual hematoma, give moxifloxacin (Avelox®) 400mg PO qd for 7 days.

DISPOSITION:
Evacuation should not be required for this injury if the subungual hematoma is successfully treated.

TESTICULAR PAIN PROTOCOL

SPECIAL CONSIDERATIONS:
1. The primary concern in testicular pain is differentiating testicular torsion from other causes of testicular pain
2. Testicular torsion is an medical emergency requiring urgent correction to prevent loss of the affected testicle
3. Other common causes of testicular pain include epididymitis and orchitis, infections commonly caused by STDs, as well as hernias and testicular masses

SIGNS AND SYMPTOMS:
1. Testicular Torsion:
   a. Sudden onset testicular pain
   b. Usually associated with activity
   c. Associated testicular swelling
   d. Abnormal position of the affected testicle
   e. Symptoms may be increased by testicular elevation
   f. Usually associated with pain induced nausea and vomiting
   g. **Loss of cremasteric reflex is the best diagnostic indicator for testicular torsion.**
2. Epididymitis:
   a. Gradual onset of worsening pain
   b. May have fever and/or dysuria
   c. Can also be traumatic
   d. Symptoms may be relieved with elevation
   e. Significant swelling may be present

MANAGEMENT:
1. If pain is sudden onset and the testicle is lying abnormally in the scrotum, an attempt to manual detorse the testicle is warranted.
   a. A single attempt to rotate the testicle outward (like opening the pages of a book) should be made.
      i. With torsion of the left testis, hold the testicle with the right thumb and forefinger and then rotate the testicle *clockwise* 180 degrees. This manipulation may need to be repeated 2-3 times, because testicular torsion may involve rotations of 180-720 degrees. These repeated attempts should be guided by resolution of pain and return to normal anatomy.
      ii. For torsion of the right testicle, the procedure is similar except that the testicle is held using the left thumb and forefinger and the testicle is rotated in a *counterclockwise* direction.
   b. If pain increases, 1 attempt to rotate the opposite direction should be made.
   c. Successful detorsion will result in relief of pain.
2. Gradual onset of pain with a normal lying testicle should be treated per ***Urinary Tract Infection Protocol (TMEP)***.
3. Treat per ***Pain Management Protocol (TMEP)***.
4. Treat per ***Nausea and Vomiting Protocol(TMEP)***.
5. If torsion is not present, treat as presumed STD.
   a. Ceftriaxone (Rocephin®) 250mg IM **OR** ciprofloxacin (Cipro®) 500mg PO
   b. **PLUS** azithromycin (Zithromax®) single 1gm dose PO.

DISPOSITION:
1. *Urgent* evacuation for testicular torsion even if manually relieved with detorsion
2. For other causes of testicular pain, treat cause and consider evacuation if symptoms persist more than 3 days, and if the patient is operationally compromised.

URINARY TRACT INFECTION PROTOCOL

SPECIAL CONSIDERATIONS:
1. More common after instrumentation, in females, or in tactical settings with dehydration and/ or kidney stones.
2. Symptoms may be confused with a sexually transmitted disease (STD).

SIGNS AND SYMPTOMS:
1. Dysuria
2. Urinary urgency and frequency
3. Cloudy, malodorous, or dark urine may be present
4. Suprapubic discomfort

MANAGEMENT:
1. Ceftriaxone (Rocephin®) 1gm IV / IM **OR** trimethoprim-sulfamethoxazole (Septra®) 1 PO bid for 3 days
2. **AND** azithromycin (Zithromax®) 1gm PO once.
3. Treat per ***Pain Management Protocol (TMEP),*** excluding narcotics.
4. If fever, back pain, flank pain, and/ or costovertebral angle tenderness develop, suspect kidney infection and treat per ***Flank Pain Protocol (TMEP).***
5. Encourage PO hydration.

DISPOSITION:
1. Usually responds to therapy and evacuation not required if it does.
2. *Priority* evacuation for pyelonephritis. See ***Flank Pain Protocol (TMEP)***
3. *Routine* evacuation for worsening signs and symptoms
4. Upon return to base, all males should be evaluated for UTI, even if asymptomatic.

2017 Tactical Medical Emergency Protocol
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Tactical Medical Emergency Protocol Drug List:

APRIL 2019

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DEPARTMENT OF EMERGENCY MEDICAL SERVICES AND PUBLIC HEALTH
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PREFACE

- The following is a list of medications mentioned in the Tactical Medical Emergency Protocols. However, most of the TMEPs have a preferred medication recommendation and then an alternate one. All of these recommendations are listed here.
- The CEB and RB recognize that a "one size fits all" approach to a strict formulary is unrealistic due to medication availability, mission requirements, etc. The list of medications is designed to guide the SO-ATP in medication selection.
- For specific order of the recommended medications and specific TMEP application of the medications, **CHECK the specific TMEP Protocol**.
- Antibiotics: Always check potential drug allergies. If allergic to one class of medications, use alternate class of medications (cephalosporins/penicillins, tetracyclines, quinolones, macrolides).
- **Unless specifically noted, the drug dosages listed are for an adult.**
- Changes - 2009:
  - Calcium chloride added
  - Calcium gluconate added
  - Mannitol (Osmitrol®) added
  - Sodium bicarbonate added
  - Rifampin (Rifadin®) added
  - Antiretroviral medication added (Kaletra®, Atripla®, Truvada®, Viread®)
  - All medications listed under their generic name except for the following HIV medications, which are **the only drugs listed under their trade name (Atripla®, Combivir®, Truvada®, Kaletra®).**
  - Midazolam added.
  - Pregnancy Categories added according to FDA classification listed below.
- Changes - 2010:
  - Tadalafil (Cialis®) added
  - Sildenafil (Viagra®) added
  - K-9 doses added to: acetazolamide, ceftriaxone, dexamethasone, ertapenem
- Changes - 2016/2017:
  - Removed open globe injury and head injury from the list of contraindications for Ketamine
  - Added Master Drug List with NSNs from the 2008 Formulary
  - Added color blindness to list of side effects for tranexamic acid (TXA) (Cyklokapron®)
  - Added injectable Fentanyl
  - Added K-9 dosages for multiple drugs
  - Adjusted K-9 dosage for Morphine
  - Removed doxycycline from Master Drug List

Pregnancy Categories

Pregnancy Category A	Adequate and well-controlled studies have failed to demonstrate a risk to the fetus in the first trimester of pregnancy (and there is no evidence of risk in later trimesters).
Pregnancy Category B	Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women OR Animal studies have shown an adverse effect, but adequate and well-controlled studies in pregnant women have failed to demonstrate a risk to the fetus in any trimester.
Pregnancy Category C	Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.
Pregnancy Category D	There is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience or studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.
Pregnancy Category X	Studies in animals or humans have demonstrated fetal abnormalities and/or there is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience, and the risks involved in use of the drug in pregnant women clearly outweigh potential benefits.

-

Medications with grounding requirements for personnel on flight status have been added. In some cases, the recommendation for grounding has been made based on the underlying medical condition and not specifically on the medication. Whenever possible consult a Flight Surgeon or an Aeromedical Physician Assistant prior to prescribing medications to personnel on flight status. Consult your unit medical officer for any unit specific protocols.
  - **REMINDER**: After personnel on flight status have been grounded, they need clearance from a Flight Surgeon or an Aeromedical Physician Assistant to return to flying status.

Acetaminophen - PO (Tylenol®)

- Description: Nonnarcotic analgesic and antipyretic. Blocks generation of pain impulses in the CNS by preventing sensitization of pain receptors.
- Indications: Mild pain or fever, febrile reactions from blood transfusions
- Dose:
  - 325-650mg PO q 4-6hr; or 1gm PO every 6-8hr
- **Contraindications:**
  - Individuals with hypersensitivity to drug.
  - Cautious use in history of excess alcohol use
  - Chronic liver damage
- Pregnancy Category B
- Side-effects:
  - Rash
  - Urticaria,
- Adverse reactions:
  - Hemolytic anemia
  - Liver damage
- TMEP use

- *Bronchitis/Pneumonia Protocol*
- *Malaria Protocol*
- *Pain Management Protocol*
- *Administration of Blood and Blood Products Protocol*

Acetazolamide (Diamox®)

- WARNING GROUNDING medication for personnel on flight status
- Description: Non-diuretic antihypertensive (carbonic anhydrase inhibitor)
- Indications:
  - Prevention and/or amelioration of symptoms associated with acute mountain sickness in climbers attempting rapid ascent and/or in those who are very susceptible to acute mountain sickness despite gradual ascent. For maximum benefit begin regimen 7 days prior to ascent. Of minimal benefit in Rx of AMS, HACE, or HAPE.
  - Treatment of acute high altitude illness
- Dose (Human):
  - 125-250mg bid, 24 hours prior to ascent, continuing for 48 hours after ascent. Prevention and/or amelioration benefits are nominal once ascent has commenced.
  - If the 500mg sustained release tablet is used, dose is 500mg every 24 hours.
- K-9 Dose:
  - 250mg bid 24 hours prior to ascent, continuing for 48 hours after ascent.
  - If the 500mg sustained release tablet is used, dose is 500mg every 24 hours.
- **Contraindications:**
  - Sulfa allergy.
- Pregnancy category C
- Side-effects:
  - Paresthesia in extremities
  - Hearing dysfunction/tinnitus
  - Loss of appetite
  - Taste alterations
  - Nausea
  - Vomiting
  - Diarrhea
  - Polyuria
  - Drowsiness
  - Confusion
- **Warning**
  - Note: Use of Diamox results in a significant alteration in taste. Carbonated beverages will have seriously altered taste, and may be undrinkable.
  - Increased fluid intake is required with use of Diamox: Although Diamox is not in the general drug class of “diuretics”; it has diuretic effects and can result in serious dehydration unless great care is taken to maintain proper hydration.
- Adverse reactions:
  - Transient myopia (usually resolves w/ DC of drug)
  - Urticaria
  - Melena
  - Hematuria
  - Flaccid paralysis
  - Photosensitivity
  - Convulsions

- TMEP use
  - *Altitude Illness Protocol*
  - K-9 *High Altitude Sickness* and *Pulmonary Edema Protocol*

Aciphex®- See rabeprazole

Actiq® oral transmucosal fentanyl citrate (OTFC) lozenge - See fentanyl, oral

Adrenalin - See epinephrine

Afrin® nasal spray - See oxymetazoline HCl

Albuterol inhaler (Ventolin®, Proventil®)

- **WARNING** Aviation personnel are grounded until medical condition no longer interferes with safely performing aviation duties and the patient is free of side-effects.
- Description: Inhaled beta-adrenergic agonist; relaxes bronchial smooth muscle
- Indications:
  - Relief of bronchospasm
  - Prevention/ treatment of exercise-induced bronchospasm
- Adult dose:
  - 2 inhalations q 4-6hr
  - Spray 4 times into the air if using for the first time or after >4 weeks of storage
- *Pediatric dose:*
  - *If >4yrs old, 1 inhalation q 4-6hr may be sufficient*
- **Contraindications:**
  - Known hypersensitivity to Albuterol
  - Pregnancy
- Pregnancy Category C
- Side-effects:
  - Similar in nature to reaction to other sympathomimetic agents
    - Tremor
    - Nausea
    - Nervousness
    - Palpitations
- Adverse reactions:
  - Hypertension
  - Angina
  - Vertigo
  - CNS stimulation
  - Sleeplessness
- TMEP use
  - *Asthma (Reactive Airway Disease) Protocol*
  - *Bronchitis/Pneumonia Protocol*
  - *Cough Protocol*
  - *Smoke Inhalation Protocol*

Amoxicillin/clavulanic acid (Augmentin®)

- **WARNING** Aviation personnel are grounded for the initial 24 hours of antibiotic therapy and until the medical condition no longer interferes with safely performing aviation duties and the patient is free of side-effects.
- Description: Oral antibacterial combination consisting of the semisynthetic antibiotic amoxicillin and the β-lactamase inhibitor, clavulanate potassium (the potassium salt of clavulanic acid).
- Indications:
  - Lower respiratory tract infections
  - *Otitis media*
  - Sinusitis
  - Skin and skin structure infections
  - Urinary tract infections
- Adult dose: The usual adult dose is one 875mg tablet q 12hr.
- *Pediatric dose:*
  - *30mg/kg/day in divided doses (q 8-12hr) produces less nausea and diarrhea and is effective for most infections*
  - *Pediatric patients weighing 40kg or more should be dosed according to the adult recommendations.*
- K-9 Dose: Skin infections 13.75-22 mg/kg PO bid for 10-14 days UTIs 12.5 mg/kg PO bid for 7-10 days
- **Contraindications:**
  -

SERIOUS AND OCCASIONALLY FATAL HYPERSENSITIVITY (ANAPHYLACTIC) REACTIONS CAN OCCUR IN INDIVIDUALS WITH A HISTORY OF PENICILLIN HYPERSENSITIVITY
  - Do not use in patients with a history of liver failure
- Pregnancy Category B
- Side-effects: The majority of side-effects observed in clinical trials were of a mild and transient nature but can include:
  - Diarrhea/loose stools
  - Nausea
  - Skin rashes and urticaria
  - Vomiting
  - Vaginitis
- Adverse reactions:
  - Hypersensitivity reactions
  - Hepatic dysfunction
  - Blood and lymphatic dysfunction (likely hypersensitivity-related)
- TMEP use
  - *Cellulitis/Cutaneous Abscess Protocol*
  - *Dental Pain Protocol*
  - *Flank Pain Protocol*
  - *Head and Neck Infection Protocol*
  - *Ingrown Toenail Protocol*

ASA - See Aspirin

Aspirin (ASA)

- Description: Analgesic, antipyretic, anti-inflammatory, anti-platelet effect
- Indications:
  - For the temporary relief of:

        - Mild to moderate pain
        - Fever.
    - MI Prophylaxis: Reduces the risk of death and/or nonfatal myocardial infarction in patients with a previous infarction or unstable angina pectoris.
    - MI/UA treatment
    - Transient Ischemic Attacks**:** Reducing the risk of recurrent transient ischemic attacks (TIAs) or stroke in patients who have transient ischemia of the brain due to fibrin emboli.
- Adult dose:
    - 325mg. One or two tablets/caplets with water. May be repeated every 4 hours as necessary up to 12 tablets/caplets a day or as directed by a doctor.
- *Pediatric dose:*
    - *>12 years and over: One or two tablets/caplets with water. May be repeated every 4 hours as necessary up to 12 tablets/caplets a day or as directed by a doctor*
    - *<12 years old: Do not give to children under 12 unless directed by a doctor.*
- **Contraindications**:
    - Hypersensitivity to aspirin
    - Hypersensitivity to nonsteroidal anti-inflammatory agents (NSAID)
    - History of gastrointestinal bleeding
    - Patients with bleeding disorders (e.g., hemophilia).
    - Patient age < 16 years old
- Pregnancy Category D
- Side-effects:
    - Gastrointestinal symptoms
    - Gastrointestinal bleeding
    - Stomach pain
    - Heartburn
    - Nausea
    - Vomiting
- Adverse reactions:
    - Interacts with NSAIDs, Coumadin, Heparin

TMEP use

- *Chest Pain Protocol*
- *Deep Venous Thrombosis (DVT) Protocol*

Atovaquone 250mg/ proguanil 100mg (Malarone®)

- **WARNING** GROUNDING medication for personnel on flight status
- Description: Antimalarial
- Indications:
    - Prophylaxis and treatment of *Plasmodium falciparum malaria*
- Adult dose:
    -

There are pediatric tablets as well as adult tablets
    - Prophylaxis
        - Start treatment 1 or 2 days prior to entering malaria endemic area and continue daily during the stay and for 7 days after return
        - 1 tablet (adult strength) daily
    - Treatment
        - 4 tablets (adult strength; total daily dose atovaquone 1gm / 400mg proguanil) as a single daily dose for 3 consecutive days
- *Pediatric dose:*
    -

There are pediatric tablets as well as adult tablets

- *Tablets may be crushed and mixed with condensed milk just prior to administration for those having difficulty in swallowing tablets*
- *Prophylaxis dosing based on body weight*
  - *Safety and efficacy for prophylaxis have been established for children >11kg*
- *Treatment dosing based on body weight*
  - *Safety and efficacy for treatment have been established for children > 5kg*

Dosage of atovaquone/proguanil in prevention of malaria in pediatric patients		
Weight (kg)	***Total daily dose***	***Dosage regimen***
11 to 20	*62.5mg / 25mg*	*1 pediatric tablet daily*
21 to 30	*125mg / 50mg*	*2 pediatric tablets as a single daily dose*
31 to 40	*187.5mg / 75mg*	*3 pediatric tablets as a single daily dose*
>40	*250mg / 100mg*	*1 tablet (adult strength) as a single daily dose*

Dosage of atovaquone/proguanil in treatment of malaria in pediatric patients		
Weight (kg)	***Total daily dose***	***Dosage regimen***
5 to 8	*125mg / 50mg*	*2 tablets (pediatric strength) daily for 3 consecutive days*
9 to 10	*187.5mg / 75mg*	*3 tablets (pediatric strength) daily for 3 consecutive days*
11 to 20	*250mg / 100mg*	*1 tablet (adult strength) daily for 3 consecutive days*
21 to 30	*500mg / 200mg*	*2 tablets (adult strength) as single daily dose for 3 consecutive days*
31 to 40	*750mg / 300mg*	*3 tablets (adult strength) as single daily dose for 3 consecutive days*
>40	*1gm / 400mg*	*4 tablets (adult strength) as single daily dose for 3 consecutive days*

- **Contraindications:**
  - Hypersensitivity to atovaquone, proguanil
  - Prophylaxis in patients with severe renal impairment (Cr CL < 30mL/min) unless potential benefits outweigh risks of non-treatment (proguanil accumulates in severe renal failure)
- Pregnancy Category C
- Side-effects:
  - Headache
  - Abdominal pain
  - Nausea/ vomiting/diarrhea
  - Dizziness
  - Cough (pediatrics)
- Adverse reactions:
  - Liver transaminase elevations
  - Possible association with seizures and psychotic events (e.g., hallucinations)
  - Cutaneous reactions, including photosensitivity, *erythema multiforme* and Stevens-Johnson Syndrome
- Other notes:
  - Take daily dose at the same time every day with food or milk
  - If vomiting occurs within 1 hour of dosing, repeat the dose
  - Treatment has not been evaluated for treatment of cerebral malaria or other severe manifestations of complicated malaria
  - Absorption may be reduced in patients with diarrhea or vomiting. May need to add antiemetic to prevent vomiting.
  - Include protective clothing, insect repellants, bed nets as important components of malaria prophylaxis
  - If a dose is skipped, take it as soon as possible, and then return to normal schedule. Do not double the next dose.
- TMEP use

- *Malaria Protocol*

Atripla® (efavirenz/emtricitabine/tenofovir)

- **WARNING** GROUNDING medication for personnel on flight status.
- Indications: Treatment of HIV
- Dose:
  - Take 1 tablet qd PO on an empty stomach. Dosing at bedtime may improve the tolerability of nervous system symptoms
- **Contraindications:**
  - Do not take the following medicines with Atripla®
    - Cisapride (Propulsid®)
    - Midazolam
    - Tiazolam (Halcion®)
    - Voriconazole (Vfend®)
- Pregnancy Category D
- Side-effects:
- Cardiac disorders: Palpitations
- Ear and labyrinth disorders: Tinnitus
- Endocrine disorders: Gynecomastia
- Eye disorders: Abnormal vision
- Gastrointestinal disorders:
  - Constipation
  - Malabsorption
  - Abdominal pain
  - Increased amylase,
  - Pancreatitis
- Hepatobiliary disorders:
  - Hepatic enzyme increase,
  - Hepatic failure
  - Hepatitis
- Immune system disorders:
  - Allergic reaction
- Metabolism and nutrition disorders:
  - Hypercholesterolemia
  - Hypertriglyceridemia
  - Hypophosphatemia
  - Lactic acidosis
- Musculoskeletal and connective tissue disorders:
  - Arthralgia
  - Myalgia
  - Myopathy
- Nervous system disorders:
  - Abnormal coordination
  - Ataxia
  - Cerebellar coordination and balance disturbances
  - Convulsions
  - Hypoesthesia
  - Paresthesia
  - Neuropathy
  - Tremor
- Psychiatric disorders:
  - Aggressive reactions
  - Agitation
  - Delusions
  - Emotional lability

    - Mania
    - Neurosis
    - Paranoia
    - Psychosis
    - Suicide
- Respiratory, thoracic, and mediastinal disorders:
    - Dyspnea
- Renal and urinary disorders:
    - Renal insufficiency
    - Renal failure
- Skin and subcutaneous tissue disorders:
    - Flushing
    - Photoallergic dermatitis
    - Skin discoloration
    - Stevens-Johnson Syndrome
- Other notes:
    - Store at 77 °F (25 °C); excursions permitted to 59-86 °F (15-30 °C)
- TMEP use:
    - *HIV Post Exposure Prophylaxis Protocol*

Augmentin®- See amoxicillin/clavulanic acid

Avelox®- See moxafloxacin

Azithromycin (Zithromax®, Z-Pak®)

- **WARNING** Aviation personnel are grounded for the initial 24 hours of antibiotic therapy and until the medical condition no longer interferes with safely performing aviation duties and the patient is free of side-effects.
- Description: Macrolide antibiotic
- Indications:
    - Acute bacterial sinusitis
    - Mild community-acquired pneumonia
    - Chancroid (Genital ulcer disease)
    - Pharyngitis/tonsillitis as alternative drug choice to first line therapy
    - Uncomplicated skin infections
    - Urethritis
- Adult dose:
    - For most bacterial infections: 500mg as single dose on day 1, then 250mg daily on days 2 through 5.
    - For gonorrhea: 2gm PO as a single dose
- *Pediatric dose: (6 months of age or older)*
    - *Z-pak® is not indicated for children. The oral suspension is the only dose approved for use in children, and is dosed on a mg/kg basis*
        - *10mg/kg up to 500mg the first day; then 5mg/kg up to 250mg for the next 4 days*
- **Contraindications:**
    - Known allergy to azithromycin
    - Pregnancy
    - Z-pak® in children
    - Patients receiving
        - Astemizole (Hismanal®) - antihistamine taken off of the U.S. market)
        - Cisapride (Propulsid®) - GI medication taken off of the U.S. market)
- Pregnancy Category B
- Side-effects:

    - Generally mild and reversible upon discontinuation of therapy
    - Nausea, vomiting, diarrhea, abdominal pain
- Adverse reactions
    - Rare:
        - Angioedema (swelling of the larynx)
        - Cholestatic jaundice
    - Hypersensitivity
- Other notes
    - Can be taken with or without food
    - Continue regimen for duration of prescription
- TMEP use:
    - *Bronchitis/Pneumonia Protocol*
    - *Ear Infection Protocol*
    - *Gastroenteritis Protocol*
    - *Urinary Tract Infection Protocol*

AZT (zidovudine (Retrovir®))

-

GROUNDING medication for personnel on flight status
- Indications:
    - Treatment of HIV infection
- Dose:
    - 300mg bid
- Contraindications: Known allergy to medication
- Pregnancy Category C
- Side-effects:
    - Body as a whole:
    - Back pain
    - Chest pain
    - Flu-like syndrome
    - Generalized pain
- Cardiovascular:
    - Cardiomyopathy
    - Syncope
- Endocrine:
    - Gynecomastia.
- Eye:
    - Macular edema
- Gastrointestinal:
    - Dysphagia
    - Flatulence
    - Oral mucosa pigmentation
    - Mouth ulcer
    - Nausea
    - Vomiting
    - Diarrhea
- General:
    - Anaphylaxis
    - Angioedema
    - Vasculitis
- Heme and lymphatic:
    - Aplastic anemia
    - Hemolytic anemia
    - Leukopenia
    - Lymphadenopathy
    - Pancytopenia with marrow hypoplasia

    - Pure red cell aplasia
- Hepatobiliary tract and pancreas:
    - Hepatitis
    - Hepatomegaly with steatosis
    - Jaundice
    - Lactic acidosis
    - Pancreatitis
- Musculoskeletal:
    - Muscle spasm
    - Myopathy
    - Myositis
    - Rhabdomyolysis
    - Tremor
- Nervous:
    - Anxiety
    - Confusion
    - Depression
    - Dizziness
    - Loss of mental acuity
    - Mania
    - Paresthesia
    - Seizures
    - Somnolence
    - Vertigo
- Respiratory:
    - Dyspnea
    - Rhinitis
    - Sinusitis
    - Cough
    - Abnormal breathing and wheezing
- Skin:
    - Changes in skin and nail pigmentation
    - Pruritus
    - Stevens-Johnson Syndrome
    - Toxic epidermal necrolysis
- Special senses:
    - Amblyopia
    - Hearing loss
    - Photophobia
- Urogenital:
    - Urinary frequency
    - Urinary hesitancy
- TMEP use:
    - *HIV Post Exposure Prophylaxis Protocol*

Bactrim®- See trimethoprim-sulfamethoxazole

Bactroban®- See mupirocin ointment 2%

Benadryl®- See diphenhydramine HCl

Bisacodyl (Dulcolax®)

- Description: Stimulant laxative
- Indications: Used to treat constipation or to clean out the intestinal tract before bowel examinations or bowel surgery.

- Adult dose: Swallow the tablets whole with a full glass of water or juice. Do not crush or chew the tablets. The tablets should work within 6-10hrs.
    - 5-15mg.
- *Pediatric dose:*
    - 6 to 12 years: 5mg, taken at bedtime or in the morning before breakfast to produce evacuation approximately 8 hours later.
- **Contraindications**:
    - Ileus
    - Intestinal obstruction
    - Acute surgical abdominal conditions like acute appendicitis, acute inflammatory bowel diseases.
    - Severe dehydration.
    - Known hypersensitivity to substances of the triarylmethane group.
- Adverse reactions: Rarely, abdominal discomfort and diarrhea have been reported.
- Other notes:
    - Tablets have a special coating and therefore should not be taken together with milk or antacids. Tablets should be swallowed whole with adequate fluid.
- TMEP use:
    - *Constipation/Fecal Impact Protocol*

Calcium chloride (10% solution)

-

GROUNDING medication for personnel on flight status.
- Description: Calcium salt (electrolyte)
- Action
    - Increased calcium levels
    - Has a role in the release of neurotransmitters and hormones
    - Increased cardiac contractile state
    - May increase ventricular automaticity
- Indications:
    - Acute hypocalcemia
    - Acute hyperkalemia
    - Calcium channel blocker overdose
    - Hypermagnesemia
    - Cardiac arrest due to hyperkalemia, hypocalcemia
- Adult dose:
    - 0.5-1gm (5-10mL of a 10% solution) slow IVP over 3 to 5 minutes
- *Pediatric dose:*
    - *20mg/kg (0.15-3.0mL/kg of a 10% solution) slow IV push.*

Maximum dose = 1gm or 10mL

- **Contraindications:**
    - Hypercalcemia
    - Digitalis toxicity
    - Renal or cardiac disease
- Pregnancy Category: Generally considered to be safe
- Side-effects/precautions
    -

Extravasation may cause tissue damage and necrosis
    - Rapid injection may cause vasodilation, hypotension, bradycardia, cardiac dysrhythmia, syncope, and cardiac arrest
- Other notes:

-

Will precipitate if mixed with sodium bicarbonate
- TMEP use:
  - *Crush Injury Protocol*

Calcium gluconate (Kalcinate®)

-

GROUNDING medication for personnel on flight status.
- Description: Calcium salt
- Action:
  - Increased calcium levels
  - Has a role in the release of neurotransmitters and hormones
  - Increased cardiac contractile state
  - May increase ventricular automaticity
- Indications:
  - Acute hypocalcemia
  - Acute hyperkalemia
  - Calcium channel-blocker overdose
- Dose:
  - 1gm (10mL of a 10% solution)
  - 1.5-3 gm of a 10% calcium gluconate aqueous solution (1gm in 10mL vial) over 2-5min SLOW IV push.
- **Contraindications:**
  - Hypercalcemia
  - Digitalis toxicity.
  - Renal or cardiac disease
- Pregnancy class: Generally considered to be safe
- Side-effects/precautions
  -

Extravasation may cause tissue damage and necrosis
  - Rapid injection may cause vasodilation, hypotension, bradycardia, cardiac dysrhythmia, syncope, and cardiac arrest
- Other notes:
  -

Will precipitate if mixed with sodium bicarbonate
- TMEP use:
  - *Crush Injury Protocol*

Ceftriaxone sodium (Rocephin®)

-

Aviation personnel are grounded for the initial 24 hours of antibiotic therapy and until the medical condition no longer interferes with safely performing aviation duties and the patient is free of side-effects.
- Description: 3rd generation cephalosporin
- Broad-spectrum bactericidal antibiotic for IV / IM use.
- Indications: Serious infections of the lower respiratory tract (i.e., pneumonia); urinary tract; skin infections; intra-abdominal infections (especially penetrating abdominal trauma); penetrating trauma to the extremities; & CNS infections

- Adult dose:
  - 1-2gm IM / IV daily or in divided doses bid; max dose 4gm/day
- *Pediatric dose:*
  - *50-75mg/kg given in divided doses q12 hours; max dose 2gm/day.*
- K-9 Dose
  - 1gm IV / IM daily. May cause pain on IM injection, Give IV slowly over 30 minutes.
- **Contraindications:**
  - Use caution in patients with a history of
    - Penicillin allergy
    - Hepatic dysfunction
    - Liver dysfunction
- Pregnancy Category B
- Side-effects:
  - Headaches
  - Dizziness
  - Nausea
  - Vomiting
  - Diarrhea
  - Abdominal cramps
  - Urticaria
  - ↑ temperature
- Adverse reactions:
  - Eosinophilia
  - Thrombocytosis
  - Leukopenia
  - Injection Site
    - Pain
    - Induration
    - Sterile abscess
    - Tissue sloughing
    - Phlebitis
  - Thrombophlebitis with IV use
- Preparation procedure:
  - Withdraw 10mL NaCl from a 100mL bag. Inject 10mL NaCl into 1gm ceftriaxone vial. Mix.
  - Withdraw entire contents of vial and inject into original 100mL NaCl IV bag. Mix.
  - Piggyback with running IV.
  -

If giving IM, reconstitute with 1% lidocaine **WITHOUT** epinephrine.
- TMEP use:
  - *Abdominal Pain Protocol*
  - *Bronchitis/Pneumonia Protocol*
  - *Dental Pain Protocol*
  - *Flank Pain (Renal Colic, Pyelonephritis, Kidney Stones) Protocol*
  - *Head and Neck Infection Protocol*
  - *Joint Infection Protocol*
  - *K-9 Trauma Management Protocol*
  - *Meningitis Protocol*
  - *Sepsis/Septic Shock Protocol*
  - *Tactical Trauma Protocol*
  - *Urinary Tract Infection Protocol*

Cephalosporins - general antimicrobial spectrum

- WARNING Aviation personnel are grounded for the initial 24 hours of antibiotic therapy and until the medical condition no longer interferes with safely performing aviation duties and the patient is free of side-effects.

- 1st generation: Gram positive (including Staph aureus); basic gram negative coverage.
  - *Examples: cefazolin, cephalexin, cefadroxil*
- 2nd generation: Diminished Staph aureus, improved gram negative coverage compared to 1st generation; some with anaerobic coverage.
  - *Examples: cefotetan, cefoxitin, cefuroxime*
- 3rd generation: Further diminished Staph aureus; further improved gram negative coverage compared to 1st and 2nd generation; some with pseudomonas coverage and diminished gram positive coverage.
  - *Examples: ceftriaxone **(see Rocephin®)**, cefotaxime, cefpodoxime, cefixime, cefoperazone.*
- 4th generation: Same as 3rd generation plus coverage against Pseudomonas.
  - *Example: cefepime*

Cerebyx®- See fosphenytoin

Chloroquine phosphate

- Indications:
  - Malaria due to *P. vivax, P. malariae, P. ovale*, and susceptible strains of *P. falciparum.*
- Dose
  - The dosage of chloroquine phosphate is often expressed in terms of equivalent chloroquine base. Each 500mg tablet of chloroquine phosphate contains the equivalent of 300mg chloroquine base.
- Adult dose:
- Prophylaxis: 500mg (= 300mg base) on the same day of each week. Initiate therapy 1 to 2 weeks prior to departure to endemic area
- Dose must be administered on same day of week
- Continue prophylaxis for 4 additional weeks upon return from endemic area
- Treatment: 1gm PO x1 then 500mg PO daily x 3 days starting 6 hours after first dose
- *Pediatric dose: The weekly suppressive dosage is 5mg calculated as base, per kg of body weight, but should not exceed the adult dose regardless of weight*.

- Precautions: Liver disease, blood disorders, psoriasis, a certain metabolic disease (glucose-6-phosphate dehydrogenase-G6PD deficiency), hearing problems, seizures.
- **Contraindications:** Known allergy to medication
- Pregnancy Category C - Generally accepted as safe.
- Side-effects
  - Nausea
  - Vomiting
  - Stomach upset
  - Cramps
  - Loss of appetite
  - Diarrhea
  - Blurred vision
  - Trouble seeing at night or problems focusing clearly
  - Easy bleeding or bruising.

- Warnings:

- It has been found that certain strains of *P. falciparum* have become resistant to chloroquine and hydroxychloroquine. Chloroquine resistance is widespread and, at present, is particularly prominent in various parts of the world including sub-Saharan Africa, Southeast Asia, the Indian subcontinent, and over large portions of South America, including the Amazon basin[1].
- Before using chloroquine for prophylaxis, it should be ascertained whether chloroquine is appropriate for use in the region to be visited by the traveler. Chloroquine should not be used for treatment of P. *falciparum* infections acquired in areas of Chloroquine resistance or malaria occurring in patients where Chloroquine prophylaxis has failed. Patients infected with a resistant strain of plasmodia, as shown by the fact that normally adequate doses have failed to prevent or cure clinical malaria or parasitemia, should be treated with another form of antimalarial therapy.
    - Drug interactions
- Ampicillin
- Antacids
- Cimetidine
- Cyclosporine
- Kaolin
- Magnesium trisilicate.

- TMEP use
    - *Malaria Protocol*

Cialis®- see tadalafil

Cyklokapron®- see tranexamic acid (TXA)

Combivir®- (lamivudine and zidovudine (AZT, ZDV))

- **WARNING** GROUNDING medication for personnel on flight status
- Indications: HIV infection
- Dose:
    - One Combivir® tablet given twice daily
- **Contraindications:** Known allergy to medication.
- Pregnancy Category C
- Side-effects:
    - Cardiovascular:
        - Cardiomyopathy.
    - Endocrine and metabolic:
        - Gynecomastia
        - Hyperglycemia
    - Gastrointestinal:
        - Oral mucosal pigmentation
        - Stomatitis.
        - Nausea
        - Vomiting
        - Diarrhea
        - Decreased appetite
    - General:
        - Vasculitis
        - Weakness
        - Malaise and fatigue
        - Fever or chills
    - Heme and lymphatic:
        - Anemia, (including pure red cell aplasia and severe anemias)

        - Lymphadenopathy
        - Splenomegaly.
    - Hepatic and pancreatic:
        - Lactic acidosis
        - Hepatic steatosis
        - Pancreatitis
        - Posttreatment exacerbation of hepatitis B
    - Hypersensitivity:
        - Sensitization reactions (including anaphylaxis)
        - Urticaria
    - Musculoskeletal:
        - Muscle weakness
        - Myalgia
        - Arthralgia
        - Rhabdomyolysis.
    - Nervous:
        - Paresthesia
        - Peripheral neuropathy
        - Seizures
        - Dizziness
    - Respiratory:
        - Abnormal breath sounds
        - Wheezing
    - Skin:
        - Alopecia
        - *Erythema multiforme*
        - Stevens-Johnson Syndrome.
- TMEP use:
    - *HIV Post Exposure Prophylaxis Protocol*

Decadron®- See dexamethasone

Dexamethasone (Decadron®)

- GROUNDING medication for personnel on flight status
- Description: Parenteral steroid (glucocorticoid)
- Indications:
    - Emergency treatment of AMS, HACE, HAPE, when tactical conditions preclude descent or acclimatization.
    - Use of dexamethasone ↓symptoms of AMS, but does not speed acclimatization.
    - Use of dexamethasone does not preclude the need for an emergency descent. (Administer dexamethasone every 6 hours until descent is accomplished)
    - Inflammatory conditions
    - Allergic conditions
- Dose (Human): 4mg IV / IM / PO q 6hr

- K-9 Dose: 0.1 mg/kg IV, IM, or SC - not used in many cases, use judiciously
- **Contraindications:**
    - Use caution in patients with a history of:
        - Diabetes
        - Hypertension

        - Ulcers
- Pregnancy Category C
- Side-effects:
    - Delayed wound healing
    - Acne
    - Various skin eruptions
    - Edema
- Adverse effects usually dose related.
    - Psychotic behavior
    - Congestive heart failure
    - Hypertension
    - Cataracts
    - Glaucoma
    - Hypokalemia
    - Hyperglycemia
    - Carbohydrate intolerance
- TMEP use:
    - *Altitude Illness Protocol*
    - *Anaphylactic Reaction Protocol*
    - *Asthma (Reactive Airway Disease) Protocol*
    - *Contact Dermatitis Protocol*
    - *Head and Neck Infection, Including Epiglottitis, Protocol*
    - *K-9 Anaphylaxis Protocol*
    - *K-9 High Altitude Sickness and Pulmonary Edema Protocol*
    - *Meningitis Protocol*
    - *Sepsis/Septic Shock Protocol*
    - *Smoke Inhalation Protocol*

Dextrose - See Glutose™

Diamox®- See acetazolamide

Diazepam (Valium®)

- **WARNING** GROUNDING medication for personnel on flight status
- Description: General CNS depressant (anticonvulsant/sedative). Benzodiazepine Class.
- Indications:
    - Acute anxiety
    - Seizures
    - Status epilepticus
    - Relaxation of skeletal muscle
    - Drug of choice for treatment of convulsions associated with chemical agents or organophosphates. Note: Successful treatment of convulsions from organophosphate or chemical exposure may require mass quantities and repeated administration of Diazepam (Valium).
    - Has **NO** analgesic or anesthetic properties.
    - Overdose may be reversed w/ flumazenil (Romazicon®)
- Dose:
    - Status Epilepticus: 5-10mg IV slow push
    - Acute anxiety: 5-15mg IV slow push
    - Relaxation of skeletal muscle: 5-15mg IV slow push
    - Chemical warfare: 10-15mg IV slow push
        - Auto injection Diazepam should be used for seizures induced by chemicals

- K-9 Dose: 15 -30 mg (0.5-1 mg/kg) IV or rectally per standard 30kg dog
- **Contraindications:**
  - ↓ BP
  - Acute narrow angle glaucoma
  -

Has additive effect with other respiratory depressants (morphine, promethazine (Phenergan®) and alcohol). Be prepared to perform BLS.
- Pregnancy Category D
- Side-effects:
  - ↓ BP
  - ↓ Respirations
  - Drowsiness
  - Venous irritation
  - Pain at injection site
  - N & V
- Adverse reactions:
  - Bradycardia
  - CV collapse
  - Amnesia
  - Abdominal discomfort
- TMEP use:
  - *Back Pain Protocol*
  - *Behavioral Changes Protocol*
  - *Heat Illness Protocol*
  - *K-9 RDX (C-4) Ingestion Protocol*
  - *Seizure Protocol*
- TTP use :
  - Head injury induced seizures

Diflucan®- See Fluconazole

Diphenhydramine HCl (Benadryl®)

-

GROUNDING medication for personnel on flight status
- Description: Antihistamine. Prevents (but does not reverse) histamine-mediated responses. H1 blocker.
- Indications:
  - Mild to moderate allergic symptoms and/or allergic reactions
  - Dystonic reaction
- Adult dose:
  - 25-50mg IM / IV / PO q 6 hrs; max dose 400mg/day.
- *Pediatric dose:*
  - *(Children < 12 years): 5mg/kg/day in divided doses qid PO / IM / IV.*
- K-9 Dose: 1-2 mg/kg SC, IM, or PO (capsules)
- **Contraindications:**
  - Asthma
  - Pregnant or lactating females
- Pregnancy Category C
- Side-effects:

    - Sedation
    - Blurred vision
    - Nausea
    - Vomiting
    - Diarrhea
    - Headache
- Adverse reactions:
    - Insomnia
    - Vertigo
    - Palpitations
    - Dry mouth
    - Constipation
    - Dysuria
    - Urine retention
- TMEP Use:
    - *Allergic Rhinitis/Hay Fever/Cold Like Symptoms Protocol*
    - *Anaphylactic Reaction Protocol*
    - *Contact Dermatitis Protocol*
    - *Envenomation Protocol*
    - *K-9 Anaphylactic Reactions and Envenomation Protocol*
    - *Nausea and Vomiting Protocol*

Dulcolax®- See Bisacodyl

Efavirenz and Emtricitabine and Tenofovir - See Atripla®

Emtricitabine and Efavirenz and Tenofovir - See Atripla®

Emtricitabine and Tenofovir - See Truvada®

Epinephrine (Adrenaline®)

- **WARNING** GROUNDING medication for personnel on flight status
- Description: Alpha and beta adrenergic sympathomimetic.
    - First-line drug for anaphylaxis (See ACLS drugs for cardiac therapy)
    - Causes bronchodilatation, vasoconstriction, increases blood pressure.
    - Decreases edema/swelling due to allergic reactions.
        - Note:
            - 1:1,000 dilution epinephrine (1mg in 1mL) is standard pararescue issue.
            - 1:10,000 dilution (1mg in 10mL) is the standard 'Cardiac' dosage form for IV use.
            - 1:1,000 epinephrine can be diluted to the 1:10,000 form by putting 1mL of 1:1,000 epinephrine (1mg epinephrine) in 9mL of normal saline (total volume of 10mL).
- Indications: Anaphylaxis
    - Allergic reactions (mild/moderate/severe)
    - Asthma
- Adult dose (Epinephrine):
    - Anaphylaxis: 0.3-0.5mg (3-5mL of 1:10,000 dilution) IV or 0.3-0.5mg (0.3-0.5mL of 1:1,000 dilution) IM
    - Allergic reaction: 0.3-0.5mg (0.3-0.5mL of 1:1,000 dilution) SQ / IM
    - Asthma: 0.3-0.5mg (0.3-0.5mL of 1:1,000 dilution) SQ / IM
- *Pediatric dose: 0.01mg/kg SQ / IM. Not to exceed 0.5mg*

- K-9 Dose: 2.5-5 mcg/kg IV or 10 mcg/kg IM (EpiPen® can be used in typical 30kg dog)
- **Contraindications:**
  - **1:1,000 Epinephrine is NOT given IV**.
  - Use caution in patients with a history of heart disease or over the age of 40.
  - Do not inject Epinephrine (or solutions containing Epi) into/near the fingers, toes, nose, ears or penis. Intense vasoconstriction may cause necrosis.
- Pregnancy Category C
- Side-effects:
  - Cardiac arrhythmias
  - Ventricular tachycardia
  - Ventricular fibrillation
  - Angina
  - Hypertension
  - ↑BP
  - Nausea
  - Vomiting
  - Vasoconstriction
- Adverse reactions
  - Uncontrolled effects on myocardium & arterial system
- TMEP use:
  - *Anaphylactic Reaction Protocol*
  - *Asthma (Reactive Airway Disease) Protocol*
  - *K-9 Anaphylactic Reactions and Envenomation Protocol*
  - *Sepsis/Septic Shock Protocol*

Ertapenem IV (Invanz®)

- **WARNING** Aviation personnel are grounded for the initial 24 hours of antibiotic therapy and until the medical condition no longer interferes with safely performing aviation duties and the patient is free of side-effects.
- Description: Carbapenem antibiotic
- Indications
  - Complicated intra-abdominal infections
  - Complicated skin infections
  - Pneumonia
  - Complicated UTI, including pyelonephritis
  - Acute pelvic infections
  - **Drug of choice for penetrating battlefield trauma**
- Adult dose
  - 1gm daily
  - May be administered IV up to 14 days or IM injection for up to 7 days
  - For IV administration, infuse over 30 minutes
- *Pediatric dose*
  - *Not approved in patients < 18 yrs*
- K-9 Dose**:** 15 mg/kg IV/IM bid, Do not exceed 1 gram in a 24 hour period
- **Contraindications:**
  - Hypersensitivity to ertapenem
  - Penicillin allergy with documented severe reaction to PCN
  - Hypersensitivity to other carbapenem antibiotics
  - Anaphylactic reactions to other beta-lactam antibiotics

    - IM: hypersensitivity to lidocaine or other anesthetics of amide-type
- Pregnancy Category B
- Side-effects:
    - Diarrhea
    - Infused vein phlebitis/thrombophlebitis
    - Nausea/ vomiting
    - Headache
    - Vaginitis
- Adverse reactions:
    - Seizures
- Other notes:
    - Visually inspect any solution of ertapenem for particulate matter and discoloration prior to use when possible. Solutions range in color from colorless to pale yellow. Variations in color do not affect potency of the drug.
    - IV administration - must be reconstituted prior to administration
        - Do not mix or co-infuse with other medications
        - Do not use diluents containing dextrose
        - Reconstitute the contents of a 1gm vial of ertapenem with 10mL of 0.9% NaCl, or bacteriostatic water for injection
        - Shake well to dissolve, and immediately transfer contents to 50mL of 0.9% NaCl
        - Complete infusion within 6 hrs of reconstitution
    - IM administration - must be reconstituted prior to administration
        - Reconstitute the contents of a 1gm vial of ertapenem with 3.2mL of 1% lidocaine HCl injection (without epinephrine). Shake vial thoroughly to form solution
        - Immediately withdraw the contents of the vial, and administer by deep IM injection into a large muscle mass (such as the gluteal muscles or lateral part of the thigh)
        - Use the reconstituted IM solution within 1 hour after preparation**. DO NOT ADMINISTER THE RECONSTITUTED IM SOLUTION IV.**
- TMEP use:
    - *Abdominal Pain Protocol*
    - *Bronchitis/Pneumonia Protocol*
    - *Cellulitis/Cutaneous Abscess Protocol*
    - *Crush Injury Protocol*
    - *Flank Pain (Renal Colic, Pyelonephritis, Kidney Stone) Protocol*
    - *Joint Infection Protocol*
    - *K-9 Trauma Management Protocol*
    - *Meningitis Protocol*
    - *Sepsis/Septic Shock Protocol*

Fentanyl

- GROUNDING medication for personnel on flight status
- Description: Opioid analgesic; anesthesia adjunct.
- Indications: Severe battlefield related trauma pain and hemorrhagic shock resuscitation
- Dose: 25-50mcg IV/IO/IN/IM.
- **Contraindications:**
    - Known allergy to medication
    - Head injury
- Pregnancy Category C
- **Treatment of overdose**:
    - Ventilatory support
    - Intravenous access
    - Narcan (naloxone) or another opioid antagonist may be warranted in some instances, but it is associated with the risk of precipitating an acute withdrawal syndrome.
- Side-effects: The most serious adverse effects associated with all opioids are:
    - Respiratory depression (potentially leading to apnea or respiratory arrest)

- Circulatory depression / Bradycardia
- Nausea/vomiting
- Chest wall and skeletal muscle rigidity (high or rapid IV dose)
- Hypotension
- Shock
- All patients should be followed for symptoms of respiratory depression.

- TMEP use:
  - *Pain Management Protocol*
  - *TCCC/TTP*

Fentanyl (Actiq®) - See Oral Fentanyl

Flagyl®- See Metronidazole

Fluroquinolones - See quinolones, moxafloxacin, gatifloxacin, levofloxacin

Fluconazole (Diflucan®)

- **WARNING** Aviation personnel are grounded for the initial 24 hours of antifungal therapy and until the medical condition no longer interferes with safely performing aviation duties and the patient is free of side-effects.
- Description: Synthetic triazole antifungal agent
- Indications:
  - Vaginal candidiasis (vaginal yeast infections due to *Candida*).
  - Oropharyngeal and esophageal candidiasis.
  - Fungal skin infections
- Dose:
  - Skin infection: 150mg, 1 pill per week x 4 weeks
  - Single dose: Vaginal candidiasis: The recommended dosage of fluconazole for vaginal candidiasis is 150mg as a single oral dose.
  - Oropharyngeal candidiasis: The recommended dosage of fluconazole for oropharyngeal candidiasis is 200mg on the first day, followed by 100mg once daily. Clinical evidence of oropharyngeal candidiasis generally resolves within several days, but treatment should be continued for at least 2 weeks to decrease the likelihood of relapse.
- **Contraindications:**
  - Hypersensitivity to fluconazole.
- Pregnancy Category C
- Side-effects/adverse reactions:
  - *Dermatologic:*
    - Exfoliative skin disorders including Stevens-Johnson Syndrome and toxic epidermal necrosis.
- TMEP use:
  - *Fungal Skin Infection Protocol*

Fosphenytoin (Cerebyx®)

- **WARNING** GROUNDING medication for personnel on flight status
- Description: Parenteral phenytoin
- Indications:
  - Prevention and treatment of seizures
- Dose: 18mg/kg IV/IO at 100-150mg/min if available for seizures refractory to benzodiazepines.

    - **Do not administer faster than 150mg/min since this may result in hypotension.**
- **Contraindications:**
    - Hypersensitivity to phenytoin
    - Sinus bradycardia
    - AV block
- Pregnancy Category D
- Adverse Effects
    - Hypotension with rapid IV administration
- Other Notes
    - **Store under refrigeration at 36 °F to 46 °F (2 °C to 8 °C). The product should not be stored at room temperature for more than 48 hours.**
    - **Vials that develop particulate matter or are discolored should not be used.**
    - Because the full antiepileptic effect of phenytoin, whether given as Cerebyx or parenteral phenytoin, is not immediate, other measures, including concomitant administration of an IV benzodiazepine, will usually be necessary for the control of status epilepticus
- TMEP Use:
    - *Seizure Protocol*
    - *Tactical Trauma Protocol*

Gatifloxacin 0.3% Ophthalmic Liquid (Zymar®)

-

Aviation personnel are grounded for the initial 24 hours of antibiotic therapy and until the medical condition no longer interferes with safely performing aviation duties and the patient is free of side-effects.
- Description: Ocular fluoroquinolone
- Indications: Eye infections
- Adult dose
    - Days 1 and 2: instill 1 drop in affected eye(s) every 2 hours while awake, up to 8 times/day
    - Days 3 to 7: Instill 1 drop in affected eye(s) up to 4 times/day while awake
- *Pediatric dose*
    - *Safety and efficacy in infants < 1 year not established*
    - *Pediatric dosing like adult dosing*
- **Contraindications**
    - Hypersensitivity to any component of product
- Pregnancy Category C
- Side-effects
    - Upon instillation, may cause temporary blurring of vision or stinging
    - If stinging, burning, or itching becomes pronounced, or redness, irritation, swelling, decreasing vision, or pain persists or worsens, discontinue and consider alternative therapy
    - Lid margin crusting, white crystalline precipitates and foreign body sensation in the eye have been reported
    - Bad/bitter taste in mouth
    - Nausea
- Adverse reactions
    - Discontinue at first sign of skin rash or other allergic reaction
    - Corneal staining
    - Tearing and photophobia
- Other notes:
    - To instill in eye, tilt head back, place medication in conjunctival sac and close eye(s).
    - Apply light finger pressure on lacrimal sac for 1 minute following instillation

- To avoid bottle contamination, do not touch tip of container to any surface. Replace cap after use.
- In general, contact lenses should not be worn during therapy

- TMEP use:
  - *Corneal Abrasion, Corneal Ulcer, Conjunctivitis Protocol*
  - *Ear Infection Protocol*

Glutose™- See Glucose

Glucose (Glutose™)

- Description: Carbohydrate
- Route: Oral
- Indications: Altered mental status caused by hypoglycemia defined as;
  - Adults:
    - Diabetics = fingerstick blood glucose analysis less than 110mg/dL
    - Non-diabetics = fingerstick blood glucose analysis less than 80mg/dL
  - Children:
    - Diabetics = fingerstick blood glucose analysis less than 90mg/dL
    - Non-diabetics = fingerstick blood glucose analysis less than 60mg/dL
- Adult dose
  - Full tube given in small doses (25-50gm) - standing order
- *Pediatric dose:*
  - *0.5gm/kg in small doses - standing order*
- Drug action: Increases blood glucose level
- Onset:1 minute
- Duration: Depends on the degree of hypoglycemia
- Precautions: Assure gag reflex is present
- Side-effects:
  - Aspiration
- **Contraindications:**
  - Absent gag reflex
  - Patients who are unable to protect their own airway
  - Patients who are unable to swallow
- Pregnancy Category C
- TMEP use:
  - *Behavioral Changes Protocol*
  - *Heat Illness Protocol*
  - *Loss of Consciousness* (without seizures) *Protocol*
  - *Seizure Protocol*

Hespan® (hetastarch in NaCl) plasma volume expander (artificial colloid)
Hextend® (hetastarch in lactated electrolyte solution)

- Description: Plasma volume expander (artificial colloid)
- Both Hespan® and the newer product Hextend® are artificial colloids and are used to expand the plasma volume. The major advantage over crystalloids is that these products give more volume expansion for a longer period of time for the same infused volume. These products are not blood or plasma replacements, they have no oxygen carrying capacity, and they have no coagulation properties**. These products should not be the primary fluid used to treat dehydrated patients, but can be used if no other fluids are available.**
- Indications: Treatment of shock secondary to hemorrhage.
- Dose:
  - Patient in shock, bleeding not controlled: hold fluid and control bleeding.
  - Patient in shock, bleeding controlled: start 500mL of Hespan®/Hextend® IV, check for improvement in BP.
    - Titrate to SBP of 85 **OR** improvement in mental status **AND** presence of radial pulse. Hold further fluid when either improvement point is met.

- Patient still in shock after first 500mL of Hespan®/Hextend®; start second 500mL bag and titrate to improvement.

- K-9 Dose**:** 500mL IV over 20 -30 minutes
- **Contraindications:**
  - Known bleeding disorders or uncontrolled hemorrhage
  - CHF
  - Renal impairment
  - Not for use in children under 12 years
  - Use with caution in pregnancy.
- Pregnancy Category C
- Side-effects:
  - Nausea/vomiting
  - Peripheral and facial edema
  - Urticaria
  - Flushing chills
- Adverse reactions:
  - Severe anaphylaxis (rare)
- TMEP use:
  - *TCCC/TTP*
  - *K-9 Trauma Management Protocol*

Ibuprofen (Motrin®)

- Description: NSAID, analgesic, antipyretic. Cox-1 inhibitor.
- Indications:
  - Mild to moderate pain
  - Arthritis
- Dose:
  - 200-800mg PO tid or qid. Not to exceed 2400mg/day (800mg tid)
- **Contraindications:**
  - Note: Should not be given to pts with a history of aspirin sensitivity or severe asthma
  - Penetrating trauma
  - Suspected internal bleeding
  - Suspected intracranial bleeding
  - Pregnancy
  - Nursing mothers
- Pregnancy Category B
- Side-effects:
  - Nausea
  - Vomiting
  - Headache
  - Dizziness
  - Drowsiness
- Adverse reactions:
  - Prolonged bleeding time
  - Tinnitus
  - Edema
  - Peptic ulcer
- TMEP use:
  - *Chest Pain Protocol* (Other Etiologies)
  - *Pain Management Protocol*

Imodium®- See loperamide HCl

Invanz®- See ertapenem IV

Kalcinate®- See calcium gluconate

Kaletra® (lopinavir and ritonavir)

- **WARNING** GROUNDING medication for personnel on flight status.
- Class: Protease inhibitors.
- Action: This medication prevents human immunodeficiency virus (HIV) cells from multiplying in your body
- Indications: HIV treatment
- Dose: 4 pills daily, taken together and with Truvada®
- **Contraindications:**
    - Do not take the following medicines with lopinavir and ritonavir (Kaletra®) because they can cause serious problems or death.
        - Triazolam (Halcion®)
        - Astemizole (Hismanal®)
        - Pimozide (Orap®)
        - Cisapride (Propulsid®)
        - Terfenadine (Seldane®) (withdrawn from the U.S. market)
        - Midazolam
        - Rifampin (Rimactane®, Rifadin®, Rifater®, or Rifamate®)
        - Cholesterol lowering medicines
            - Lovastatin (Mevacor®)
            - Simvastatin (Zocor®)
            - Atorvastatin (Lipitor®)
- Pregnancy Category C
- Side-effects/precautions:
    - Body as a whole
        - Allergic reaction, back pain, chest pain, chest pain substernal, cyst, drug interaction, drug level increased, face edema, flu syndrome, hypertrophy, infection bacterial, malaise, neoplasm, and viral infection.
    - Cardiovascular system
        - Atrial fibrillation, cerebral infarct, deep vein thrombosis, migraine, myocardial infarct, palpitation, postural hypotension, thrombophlebitis, varicose vein, and vasculitis
    - Digestive system
        - Cholangitis, cholecystitis, constipation, dry mouth, enteritis, enterocolitis, eructation, esophagitis, fecal incontinence, gastritis, gastroenteritis, hemorrhagic colitis, hepatitis, hepatomegaly, increased appetite, jaundice, liver fatty deposit, liver tenderness, mouth ulceration, pancreatitis, periodontitis, sialadenitis, stomatitis, and ulcerative stomatitis.
    - Endocrine system
        - Cushing's syndrome, diabetes mellitus, and hypothyroidism.
    - Heme and lymphatic system
        - Anemia, leukopenia, and lymphadenopathy.
    - Metabolic and nutritional disorders
        - Avitaminosis, dehydration, edema, glucose tolerance decreased, lactic acidosis, obesity, peripheral edema, and weight gain.
    - Musculoskeletal system
        - Arthralgia, arthrosis, bone necrosis, joint disorder, and myasthenia.
    - Nervous system
        - Abnormal dreams, agitation, amnesia, anxiety, apathy, ataxia, confusion, convulsion, dizziness, dyskinesia, emotional lability, encephalopathy, extrapyramidal syndrome, facial paralysis, hypertonia, nervousness, neuropathy, peripheral neuritis, somnolence, thinking abnormal, tremor, and vertigo.

- Respiratory system
  - Asthma, cough, increased dyspnea, lung edema, pharyngitis, rhinitis, and sinusitis.
- Skin and appendages
  - Acne, alopecia, dry skin, eczema, exfoliative dermatitis, furunculosis, maculopapular rash, nail disorder, pruritis, seborrhea, skin benign neoplasm, skin discoloration, skin striae, skin ulcer, and sweating.
- Special senses
  - Abnormal vision, eye disorder, *otitis media*, taste loss, taste perversion, and tinnitus.
- Urogenital system
  - Abnormal ejaculation, amenorrhea, breast enlargement, gynecomastia, impotence, kidney calculus, nephritis, and urine abnormality.

- Other notes:
  - Store Kaletra® soft gelatin capsules at 36 °F - 46 °F (2 °C - 8 °C) until dispensed. Avoid exposure to excessive heat. For patient use, refrigerated Kaletra® capsules remain stable until the expiration date printed on the label. If stored at room temperature up to 77 °F (25 °C), capsules should be used within 2 months.
- TMEP use:
  - *HIV Post Exposure Prophylaxis Protocol*

Ketalar®- See Ketamine

Ketamine (Ketalar®)

- **WARNING** GROUNDING medication for personnel on flight status
- Description: Rapid acting general sedative and analgesic
- Indications:
  - Anesthetic agent for procedures
- Adult Dose: 20mg IV/IO over 1 minute, followed by 20mg increments every 30-60 seconds until nystagmus occurs or a maximum total dose of 100mg.
  -

Do not administer faster as this may result in respiratory depression.

- K-9 Dose**:** 5 mg/kg IV (use with 0.3 mg/kg midazolam)
- **Contraindications:**
  - Hypersensitivity to ketamine
- Pregnancy Category B
- Adverse Effects
  - Hypertension
  - Respiratory Depression
  - Emergence Reactions (delirium, hallucinations, confusion)
  - Increased Intra-cranial pressure
  - Increased intra-ocular pressure
  - Hypersalivation
- Other Notes
  - Do not mix ketamine hydrochloride and diazepam in syringe or infusion bottle
  - Ketamine **should not** be injected intravenously without proper dilution. It is recommended the drug be diluted with an equal volume of either Sterile Water for Injection, USP, normal saline, or 5% dextrose in water.
  - Protect from light
  - Effects of ketamine are increased when combined with other analgesics or muscle relaxants

- **Vials that develop particulate matter or are discolored should not be used.**

- TMEP Use:
  - *Procedural Analgesia Protocol*
  - *K-9 Trauma Management Protocol*

Ketorolac (Toradol®)

- Description: Analgesic, non-steroidal anti-inflammatory (NSAID). Inhibits platelet function.
- Indications:
  - For the temporary relief of:
    - Mild to moderate pain
    - Fever (if ASA or Acetaminophen is not available).
- Adult dose:
  - 30mg IV / IM. May be repeated q 6hr. ***Do not use more than 5 consecutive days.***
- *Pediatric dose*
  - *Adolescents 13-16 years and children 2-12 years: 1mg/kg IM to a maximum of 30mg or 0.5mg/kg IV to a maximum of 15mg*
- **Contraindications**:
  - Hypersensitivity to nonsteroidal anti-inflammatory agents (NSAID)
  - History of gastrointestinal bleeding
  - Patients with bleeding disorders (e.g., hemophilia).
  - Suspected or confirmed
    - Cerebrovascular bleeding
    - Hemorrhagic diathesis
    - Incomplete hemostasis
    - High risk of bleeding
  - Prior to major surgery
  - Exercise extreme caution in patients with a history of
    - Hypertension or hypertension and congestive heart failure.
    - Cardiovascular disease
    - Peripheral vascular disease
    - Cerebrovascular disease (e.g., stroke, transient ischemic attack)
  - Advanced renal impairment
  - Patients at risk for renal failure due to volume depletion
- Pregnancy Category B
- Side-effects:
  - Gastrointestinal symptoms
  - Gastrointestinal bleeding
  - Stomach pain
  - Heartburn
- TMEP use:
  - *Pain Management Protocol*

Lamivudine and zidovudine (AZT, ZDV) - See Combivir®

Lariam®- See Mefloquine

Lidocaine HCL - See Xylocaine®

-

Aviation personnel are grounded for 12 hours after the use of local anesthesia and until symptoms have resolved enough to allow safe performance of duties.
- Description: Local anesthetic; see ACLS drugs for cardiac therapy.

- Caution: Some lidocaine solutions contain 1:10,000 epinephrine. This causes intense vasoconstriction and prolongs the duration of the anesthesia. These solutions are identified by a red label or red lettering on the label. **DO NOT use solutions containing epinephrine on or near the fingers, toes, nose, ears, or penis.**

- Indications:
  - Local anesthetic: Suturing, debridement, nerve blocks, thoracostomy, or other similar procedures. Duration of anesthesia is 30 to 60 minutes.
  - Cardiac Use: Use ACLS Protocols
- Dose (Local anesthesia): To desired effect. Maximum single adult dose is 4.5mg/kg or 300mg (15mL of the 2% solution contains 300mg lidocaine).
    - Note 1: This is a different max dose than with IV lidocaine for ACLS use.
    - Note 2: 2% lidocaine contains 20mg of lidocaine per mL. Diluting 2% lidocaine 1:1 with normal saline gives a 1% solution (10mg per mL) that is just as effective as the 2% solution.
- **Contraindications:**
  - 2nd degree, 3rd degree AV block
  - Hypotension
  - Stokes-Adams Syndrome
- Pregnancy Category B
- Side-effects:
  - Slurred speech
  - Altered mental status
  - Tinnitus
  - Edema
- Adverse Reactions:
  - Dermatologic reactions
  - Status asthmaticus
  - Anaphylaxis
  - Seizures
- TMEP use:
  - *Back Pain Protocol*
  - *Cellulitis/Cutaneous Abscess Protocol*
  - *Ingrown Toenail Protocol*

Loperamide HCl (Imodium®)

- **WARNING** Aviation personnel are grounded until medical condition is not a factor and free of side-effects for 24 hours.
- Description: Antidiarrheal (opioid)
- Indications: Treatment of acute diarrhea. For use in acute, non-invasive diarrhea only.
  - Refer to medical emergencies if blood and/or mucus are present in stool, or diarrhea is associated with fever (infectious diarrhea).
- Dose: 2 capsules (4mg) first dose, then 1 capsule (2mg) after every unformed stool, not to exceed 16 mg (8 capsules) in 24 hours. Use only if control of diarrhea is critical for continued operations.

- K-9 Dose**:** 0.1-0.2 mg/kg PO q8 hr (gastroenteritis)
- **Contraindications:**
  - Acute dysentery.
  - Not for use in children < 12 years old
- Pregnancy Category B

- Side-effects:
  - Abdominal pain/distention
  - Nausea
  - Vomiting
  - Severe constipation
  - Drowsiness
  - Dizziness.
- Adverse reactions: Hypersensitivity
- TMEP use:
  - *Gastroenteritis Protocol*

Lopinavir and Ritonavir - See Kaletra®

Macrolide Class of Antibiotics - See Azithromycin (Z-Pak®)

Malarone®- See Atovaquone 250mg/ proguanil 100mg

Mannitol (Osmotrol®)

-

GROUNDING medication for personnel on flight status.
- Description: Osmotic diuretic
- Action:
  - Increases osmolarity of the glomerular filtrate, which increases the reabsorption of water, increasing sodium and chloride.
- Indications;
  - Acute Hemolytic Transfusion Reaction (AHTR)
  - K-9 Head injury
- Dose:
  - 1-2gm/kg at the rate of 5gm/hr
- **Contraindications:**
  - Anuria
  - Pulmonary edema
  - Dehydration
  - Congestive heart failure
  - Hypovolemia
  - Hypotension
  - Hypersensitivity
- Pregnancy Category C
- Side-effects/precautions
  - Sodium depletion
  - Transient volume overload
  - Pulmonary edema
  - Hypotension (excessive diuresis)
  - Angina like chest pain
  - Dizziness
  - Headache
  - Nausea and vomiting
  - Chills
  - Drug may crystallize at temperatures of 45 °F (7.2 °C) or lower
- Other notes:
  -

Use an in line filter

Mefloquine (Lariam®)

-

GROUNDING medication for personnel on flight status
-

U.S. Army Special Operations Command (USASOC) prohibits the use of Mefloquine for all personnel.
- Description: Antimalarial agent
- Indications:
  - Prevention of mild to moderate malaria caused by *Plasmodium falciparum* (including chloroquine-resistant strains) and *P. vivax*
  - Treatment of mild to moderate malaria caused by Mefloquine-susceptible strains of *P. falciparum* (both chloroquine-susceptible and resistant strains) and *P. vivax*
- Adult dose:
  - Prophylaxis: 250mg once weekly
    - Initiate therapy 1 to 2 weeks prior to departure to endemic area
    - Dose must be administered on same day of week
    - Continue prophylaxis for 4 additional weeks upon return from endemic area
  - Treatment: 5 tablets (1250mg) given as a split dose taken 6-8 hours apart.
  - Do not take on empty stomach
  - Take with at least 240mL (8oz) glass water
- *Pediatric dose*
  - *Prophylaxis:*
    - *Children > 45kg: one 250mg tablet should be taken in children*
    - *Children <45kg: weekly dose decreases in proportion to body weight (3 to 5mg/kg once weekly):*
      - *30-45kg: ¾ tablet*
      - *>20-30kg: ½ tablet*
      - *Up to 20kg: ¼ tablet*
      - *Experience with mefloquine in infants < 3 months or weighing < 5mg is limited*
    - *Initiate therapy 1 week prior to departure to endemic area*
    - *Dose must be administered on same day of week*
    - *Continue prophylaxis for 4 additional weeks upon return from endemic area*
  - *Treatment: 20-25mg/kg for nonimmune patients*
    - *Splitting the dose into 2 doses taken 6-8 hours apart may reduce adverse effects*
    - *Treatment in children has been associated with early vomiting; if patient vomits within 30 minutes of dose and a significant loss of drug is suspected by inspection of emesis, re-dose patient with full dose; if vomiting occurs within 30 to 60 minutes, administer ½ the full dose.*
    - *Do not administer on an empty stomach and give with ample water*
    - *For very young patients, dose may be crushed, mixed with water or sugar water and may be administered via oral syringe*
    - *Experience in infants < 3 months or < 5kg is limited*

- **Contraindications:**
  - Hypersensitivity to related compounds (e.g., quinine, quinidine)
  - Patients with:
    - Active depression
    - Recent history of depression
    - Generalized anxiety disorder
    - Psychosis
    - Schizophrenia or other major psych disorders
    - History of convulsions
- Pregnancy Category C

- Side-effects:
    - Cardiac rhythm disturbances
    - Exercise caution when performing activities requiring alertness and fine motor coordination such as driving, piloting, operating heavy machinery as dizziness, loss of balance have occurred with mefloquine during and following its use
- Adverse reactions:
    - Reactions (symptoms) attributable to mefloquine cannot be distinguished from symptoms of malaria. Due to long half-life of the drug, symptoms could persist for several weeks following the last dose.
    - Prophylaxis
        - Vomiting (3%)
        - Dizziness
        - Syncope (fainting)
        - Extrasystoles (skipped hearbeats; <1%)
    - Treatment
        - Dizziness, headache
        - Myalgia (muscle aches)
        - Nausea, vomiting
        - Fever, chills
        - Diarrhea
        - Skin rash
        - Abdominal pain
        - Fatigue
        - Loss of appetite
        - Tinnitus (ringing in the ears)
- Other notes:
    - Patients given mefloquine for *P. vivax* are at high risk for relapse and should subsequently receive primaquine.
    - There is insufficient clinical data to document mefloquine's effect on malaria caused by *P. ovale* or *P. malariae*
    - Liver impairment can prolong the elimination of mefloquine
    - When mefloquine is taken concurrently with oral live typhoid vaccines, attenuation of immunization cannot be excluded. Therefore, complete attenuated oral live vaccinations at least 3 days before starting mefloquine.
    - Anticonvulsant blood levels (e.g., phenytoin [Dilantin®], valproic acid [Depakote®], carbamazepine [Tegretol®], and phenobarbital) may be reduced by mefloquine and therefore risk for convulsions may increase in patients with history of epilepsy. mefloquine itself has also been associated with convulsions in the absence of anticonvulsant treatment.
- TMEP use:
    - *Malaria Protocol*

Meloxicam (Mobic®)

- Description: NSAID
- Indications:
    - Relief of the signs and symptoms of osteoarthritis and rheumatoid arthritis. .
    - Mild to moderate pain relief
- Dose:
    - 7.5mg or 15mg daily. The maximum recommended daily oral dose is 15mg.
- K-9 Dose**:** Initially 0.2 mg/kg PO once daily on Day 1 of treatment, then 0.1 mg/kg PO once daily.
- **Contraindications**:
    - Allergy to NSAID class of drugs, Aspirin.
- Pregnancy Category B (1st and 2nd trimesters)
- Pregnancy Category C (3rd trimester)

- Side-effects:
  - Allergic reaction
  - Anaphylactoid reactions including shock
  - Face edema
  - Fatigue
  - Fever
  - Hot flushes
  - Malaise
  - Syncope
  - Weight decrease
  - Weight increase
  - Dyspepsia
- TMEP use:
  - *Pain Management Protocol*

Metronidazole (Flagyl®)

- **WARNING** Aviation personnel are grounded for the initial 24 hours of antibiotic therapy and until the medical condition no longer interferes with safely performing aviation duties and the patient is free of side-effects.
- Description: Nitroimidazole antibiotic
- Indications:
  - Gastroenteritis presumed due to Giardia
- Adult dose:
  - Amebic Dysentery - 750mg PO tid x 5-10 days
  - Trichomoniasis - 2gm PO x 1 dose; OR 250mg PO tid x 7 days
  - Giardia - 250mg PO tid x 5-7 days
  - Severe anaerobic infections - 1gm IV, the 500mg IV q 6 hr
- *Pediatric dose:*
  - *Safety and efficacy have not been established, except for amebiasis. 35-50mg/kg tid for 10 days. Newborns exhibit a reduced capacity to eliminate the drug.*
- K-9 Dose**:** 15 mg/kg
- **Contraindications:**
  - Hypersensivity to any component of product, or other nitroimidazole derivatives
  - Pregnancy (first trimester in patients with Trichomoniasis)
  - Administer with caution to patients with CNS diseases
  - Use with caution in patients with history of blood dyscrasias
- Pregnancy Category B
- Side-effects:
  - Disulfiram-like reaction including flushing, palpitations, tachycardia, nausea, vomiting may occur with concomitant ethanol ingestion. Refrain from ethanol during therapy and ≥1 to 3 days afterward.
- Adverse reactions:
  - Seizures
  - Peripheral neuropathy (numbness or paresthesia of extremity)
  - Patients with undiagnosed candidiasis may present more prominent symptoms during therapy; treat with candicidal agent
- TMEP use:
  - *Abdominal Pain Protocol*
  - *Gastroenteritis Protocol*

Midazolam

- **WARNING** GROUNDING medication for personnel on flight status
- Class: Benzodiazepine
- Indications:
  - Sedation in combination with analgesia to perform brief, but painful procedures (i.e. fracture reduction)
  - Adjunct to ketamine sedation
  - Treatment of active seizures
  - Sedation of agitated patients
- Dose:
  - 0.07-0.08mg/kg IM (Average or typical adult dose is 5mg IM)
  - 5-10mg IN / IM / IV / IO for seizure control
  - 1-2mg IV slowly q 2-3 minutes to maximum adult dose of 10mg for sedation purposes. Titrate to achieve necessary level. (The patient is somewhat somnolent, but still easily arousable.)
- Side-effects:
  - Respiratory: laryngospasm, bronchospasm, wheezing, shallow respirations,
  - Cardiovascular: bradycardia, tachycardia
  - Gastrointestinal: vomiting
  - CNS/neuromuscular: retrograde amnesia, hallucination, confusion
  - Special senses: blurred vision, diplopia, nystagmus, pinpoint pupils,
  - Hypersensitivity: anaphylactoid reactions, hives, rash, pruritus.
  - Miscellaneous: yawning, lethargy, chills, weakness
- K-9 Dose**:** 0.3 mg/kg plus 5 mg/kg ketamine IV (for sedation) 0.3 mg/kg IV (for seizures)
- **Contraindications:**
  - Known sensitivity to midazolam
  - Acute narrow angle glaucoma
  - Injectable midazolam should not be administered to adult or pediatric patients in shock or coma, or in acute alcohol intoxication with depression of vital signs
  - Concurrent use of protease inhibitors (Anti-HIV)
- Pregnancy Category D
-

Warnings:
  - Use with caution when other medications capable of producing central nervous system depression are used.
  - Prior to the intravenous administration of midazolam be sure that the immediate availability of oxygen, resuscitative drugs, age and size-appropriate equipment for bag/valve/mask ventilation and intubation, and skilled personnel for the maintenance of a patent airway and support of ventilation are available.
  - Monitor patients continuously for early signs of hypoventilation, airway obstruction, or apnea.
  - Use with caution in patients with severe fluid or electrolyte disturbances.
  - Oxygen is desirable, but not absolutely required.
- Overdose treatment:
  - Flumazenil may be used to reverse the effects of midazolam after accidental over-administration. Flumazenil should not be used to reverse midazolam after seizure treatment since this may result in intractable seizures. It should also not be used in the setting of an intentional or mixed drug overdose.
  - Monitor vital signs during the recovery period.
- TMEP uses:
  - *Acute Behavioral Changes Protocol*
  - *K-9 Trauma Management Protocol*

- *K-9 RDX (C-4) Ingestion Protocol*
- *Seizures Protocol*
- *TCCC/TTP*

Mobic®- See Meloxicam

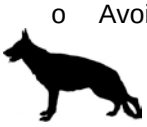
Motrin®- See Ibuprofen

Morphine Sulfate (Opioid)

- WARNING GROUNDING medication for personnel on flight status
- Description: Narcotic analgesic - alters perception of pain and emotional response to pain.
-

  - Have naloxone (Narcan®) available when using Morphine.
  - Alters perception & emotional response to pain
- Indications:
  - Severe pain
  - Pain from cardiac ischemia
- Adult dose: 4-15mg IV / IM slow push. Titrate to response.
- *Pediatric dose: 0.1-0.2mg/kg IM / IV. Do not exceed 15mg.*
- Sedation: 1 mg/kg morphine plus 0.3 mg/kg midazolam plus 5 mg/kg ketamine IM
- Side-effects:
  - ↓ RR
  - Hypotension
  - Bradycardia
  - Nausea
  - Vomiting
  - Dizziness
  - Pruritus
  - Skin flushing
- K-9 Dose:
  - Acute Pain: 10-30 mg IM
  - Sedation: 1 mg/kg morphine plus 0.3 mg/kg midazolam plus 5 mg/kg ketamine IM
- **Contraindications:**
  - Respiratory depression
  - Hypotension
  - Head injury
- Pregnancy Category B
- Adverse reactions:
  - Seizures with large doses
  - Constipation
  - Ileus
  - Urinary retention
- TMEP use:
  - *Chest Pain Protocol*
  - *Pain Management Protocol*
  - *K-9 Evaluation and Treatment Protocol*
  - *K-9 Trauma Management Protocol*
  - *K-9 RDX (C-4) Ingestion Protocol*

Moxifloxacin (Avelox®)

- WARNING Aviation personnel are grounded for the initial 24 hours of antibiotic therapy and until the medical condition no longer interferes with safely performing aviation duties and the patient is free of side-effects.
- Description: 4th generation quinolone
- Broad spectrum antibiotic with broad anaerobic coverage for PO / IV administration). Inhibits DNA preventing cellular replication and division
- Indications:
  - Community-acquired pneumonia (CAP), including CAP caused by multi-drug resistant *Streptococcus pneumoniae**
  - Complicated skin and skin structure infections, including diabetic foot infections
  - Complicated intra-abdominal infections, including polymicrobial infections such as abscesses
- Dose: 400mg/day PO / IV
  - IV infusion should be over 60 minutes
  - Avoid use with antacids;
  - Decrease dose in renal impairment
  - Avoid using with antiarrhythmics - May cause prolonged QT interval
-  K-9 Dose: 400mg orally qd
- **Contraindications:**
  - Hypersensitivity to fluroquinolones
  - Patients < 18 years old
  - Pregnancy and lactation
  - Uncorrected hypokalemia
- Pregnancy Category C
- Side-effects:
  - Headache
  - Nausea
  - Diarrhea
  - Photosensitivity
  - Insomnia
  - Vertigo,
- Adverse reactions:
  - Tendon rupture
  - Use cautiously with NSAIDs due to increased CNS stimulation
  - Prolonged QT interval
  - Abnormal dreams
  - Pseudomembranosus colitis
- Other notes:
  -

Oral antacids decrease absorption of the moxafloxacin when taken orally.
  - Visually inspect any solution of moxafloxacin for particulate matter and discoloration prior to use. Solution must be clear.
  - IV administration- must be reconstituted prior to administration
    - Do not mix or co-infuse with other medications
    - At cool temperatures precipitation may occur, which will re-dissolve at room temperature.
- TMEP use:
  - *Barotrauma Protocol*
  - *Bronchitis/Pneumonia Protocol*
  - *Cellulitis/Cutaneous Abscess Protocol*

- *Ear Infection Protocol*
- *Epistaxis Protocol*
- *Flank Pain* (Renal Colic, Pyelonephritis, Kidney Stone) *Protocol*
- *Gastroenteritis Protocol*
- *Ingrown Toenail Protocol*
- *K-9 Trauma Management Protocol/Canine TCCC*
- *Meningitis Protocol* (Prophylaxis)
- *Subungual Hematoma Protocol*

Mupirocin ointment 2% (Bactroban®)

- Description: Topical antibacterial
- Indications:
  - Impetigo
  - Topical skin infection
- Adult dose:
  - Clean affected area
  - Apply small amount of antibiotic on the area 1 to 3 times/day
  - The affected area may be covered by gauze or a sterile bandage
- *Pediatric dose:*
  - *Safety in children has been established in ages 2 to 16 yrs*
  - *Pediatric dosing like adult dosing*
- **Contraindications:**
  - Should not be used with open wounds
- Pregnancy Category B
- Side-effects:
  - Burning, stinging, pain, itching at application site
  - Adverse reactions
  - Nausea
- Adverse reactions:
  - Dry skin
  - Tenderness
  - Swelling
  - Contact dermatitis
  - Increased exudate (rare)
  - Systemic reactions (rare)
- Other notes:
  - For external use only
  - Avoid eyes and mucosal membranes
  - If no improvement in 3 to 5 days, consider alternative therapy
- TMEP use:
  - *Epistaxis Protocol*
  - *Ingrown Toenail Protocol*

Narcan®- See naloxone HCl

Naloxone HCl (Narcan®)

-

GROUNDING medication for personnel on flight status
- Description: Narcotic antagonist.
- Indications: Known or suspected narcotic induced respiratory depression.
  -

Have available when using Morphine.
- Adult dose: 0.4-2mg IV. Repeat q 2-3 min/prn.

- Duration is 20 to 40 minutes (< duration of action of Morphine). Repeat doses of may be necessary after 20 to 30 minutes.

- *Pediatric dose: 0.01mg/kg dose IM / IV / SQ q 2-3 min.*
  - *If initial dose does not result in clinical response, increase dose up to 0.1mg/kg*
  - *If no response after 10mg has been administered, diagnosis of narcotic induced toxicity should be questioned.*

- K-9 Dose: 0.02-0.04 mg/kg IV, IM, or SQ
- **Contraindications:** Known allergy to medication
- Pregnancy Category B
- Side-effects:
  - In narcotic dependent patient, withdrawal symptoms may be precipitated.
- Adverse reactions: With higher than recommended doses:
  - Nausea
  - Vomiting
  - Tachycardia
  - Hypertension
  - Tremors
- TMEP use:
  - K-9 Trauma Management Protocol
  - *Loss of Consciousness* (without seizures) *Protocol*

Nelfinavir (Viracept®)

-

GROUNDING medication for personnel on flight status
- Description: Anti-retroviral agent, protease inhibitor
- Indications: HIV post exposure prophylaxis
- Adult dose: 750mg tid or 1250mg bid if taken with food.
- *Pediatric dose: Children 2-13 years old: 45-55mg/kg bid, or 25-35mg/kg tid.*
  - *If tablets are unable to be taken may use powder form mixed with water, milk, formula, or dietary supplement. Do not use acidic juices. Once mixed, do not store for more than 6 hours.*
- **Contraindications:**
  - Hypersensitivity to Nelfinavir
  - Concurrent therapy with amiodarone, ergot derivatives, midazolam, pimozide, quinidine, triazolam
- Pregnancy Category B
- Adverse reactions:
  - Diarrhea (14-20% of adults, 39-47% of children)
  - Nausea
  - Flatulence
  - Rash
  - Decreased lymphocytes
  - Decreased neutrophils
  - Decreased hemoglobin
  - Increased creatine kinase
  - Increased transaminases
  - Abdominal pain
  - Weakness
  - Other reactions occur at a rate of less than 2%
- Other notes:
  - Has high potential for interactions with other drugs.
  - Not recommended for use with rifampin, St. John's Wort, lovastatin, simvastatin, or proton pump inhibitors. Serum levels will be significantly reduced.

- Should be taken with meals to increase plasma concentration.
- If mixed with acidic food or juice (e.g. orange juice, apple juice, applesauce) it may have a bitter taste.

- TMEP use:
  - *HIV Post Exposure Prophylaxis Protocol*

Nifedipine (Procardia®)

- GROUNDING medication for personnel on flight status
- Description: An antianginal drug belonging to a class of pharmacological agents, the calcium channel blockers. It works by relaxing blood vessels so blood can flow more easily.
- Indications
  - HAPE prophylaxis/treatment.
  - Certain types of chest pain (angina). It may help to increase exercise tolerance and decrease the frequency of angina attacks. Use other medications (e.g., sublingual nitroglycerin) to relieve attacks of chest pain.
- **Contraindications:** Known allergy to medication
- Pregnancy Category C
- Dose
  - 10mg PO, then 20mg PO q 6hr.
- Side-effects: Primarily vasodilatory in nature (hypotension, peripheral edema)

- Warning:
  - Although, in most patients, the hypotensive effect of nifedipine is modest and well tolerated, occasional patients have had excessive and poorly tolerated hypotension.
- TMEP use:
  - *Altitude Illness Protocol*

Ofirmev®- see acetaminophen

Ondansetron (Zofran®)

- GROUNDING medication for personnel on flight status
- Description: antiemetic
- Indications
  - Prevention of nausea and vomiting
- Adult dose:
  - Oral dose: 4-8mg PO tid up to 48 hrs
  - IV / IM dose : 4mg IV over 2-5 min or 4mg IM tid
- *Pediatric dose:*
  - *Oral dose:*
    - *Little information available on dosing in children <= 3 yrs*
    - *4-11 years of age: 4mg tid up to 48 hours*
    - *>12 years of age: 4-8mg PO bid up to 48 hrs*
  - *IV dose:*
    - *Little information available on dosing in children <= 2 yrs*
    - *2-12 years old and <40kg: single .1mg/kg IV dose over 2-5 min*
    - *2-12 Years and > 40kg: 4mg IV over 2-5 min*

- K-9 Dose: 0.1-0.3 mg/kg IV (slow push) q8-12 hours OR 0.5-1.0 mg/kg PO q12 hr
- **Contraindications:**
  - Hypersensitivity to any component of product
- Pregnancy Category B
- Side-effects:
  - Anxiety
  - Dizziness
  - Sedation/drowsiness
  - Headache
  - Malaise/fatigue
  - Chills/shivering
  - Constipation or diarrhea
  - Fever
  - Pruritis
  - Urinary retention
  - Musculoskeletal pain
  - Extrapyramidal symptoms
  - Arrhythmias
  - Hypotension
  - Chest pain
- Adverse reactions:
  - Elevated liver transaminases
  - Rare cases of hypersensitivity, sometimes severe (anaphylaxis) have been reported
  - Syncope (rare)
  - Grand mal seizures (rare)
  - Bronchospasm (rare)
  - Transient blurred vision (rare)
  - Hypokalemia (rare)
  - Rifampin may decrease ondansetron levels
- TMEP use:
  - K-9 Anaphylactic Reactions and Envenomation Protocol
  - *Nausea and Vomiting Protocol*

Oral transmucosal fentanyl citrate (OTFC) (Actiq®) lozenge

-

GROUNDING medication for personnel on flight status
- Description: Opioid - Oral transmucosal fentanyl citrate.
- Indications: Severe battlefield related trauma pain
- Dose: 400-800mcg.
  - The blister package should be opened with scissors immediately prior to product use. The patient should place the Actiq® lozenge unit in his or her mouth between the cheek and lower gum, occasionally moving the drug matrix from one side to the other using the handle. The Actiq® unit should be sucked, not chewed. A unit dose of Actiq®, if chewed and swallowed, might result in lower peak concentrations and lower bioavailability than when consumed as directed.
  - The Actiq® unit should be consumed over a 15-minute period. Longer or shorter consumption times may produce less efficacy than reported in Actiq® clinical trials. If signs of excessive opioid effects appear before the unit is consumed, the drug matrix should be removed from the patient's mouth immediately, and future doses should be decreased.

- K-9 Dose: place lozenge in rectum (can tape to tail) and monitor dog's response closely
- **Contraindications:** Known allergy to medication
- Pregnancy Category C
- **Treatment of overdose**:
    - Ventilatory support
    - Intravenous access
    - Naloxone (Narcan®) or another opioid antagonist may be warranted in some instances, but it is associated with the risk of precipitating an acute withdrawal syndrome.
- Side-effects: The most serious adverse effects associated with all opioids are:
    - Respiratory depression (potentially leading to apnea or respiratory arrest)
    - Circulatory depression
    - Hypotension
    - Shock
    - All patients should be followed for symptoms of respiratory depression.
- TMEP use:
    - *K-9 Trauma Management Protocol*
    - *Pain Management Protocol*

Osmotrol®- See Mannitol

Oxymetazline HCl (Afrin® nasal spray)

- Description: Vasoconstrictor (decongestant)
- Indications: Use as an adjunct to valsalva maneuver to clear ears and sinuses during compression and decompression.
- Dose: Spray into each nostril 2 times, twice daily. Not to exceed three consecutive days due to rebound congestion
    - Note: Do not tilt head backwards while spraying.
- **Contraindications:**
    - Severe damage to tympanic membrane/sinuses from barotrauma.
- Pregnancy Category C
- Side-effects:
    - Burning
    - Sneezing and stinging of nasal mucosa
- Adverse reactions:
    - Rhinitis
    - Rebound congestion

- TMEP use:
    - Epistaxis Protocol

Phenergan®- See promethazine HCl

Primaquine

- Description: Antimalarial
- Indications: Used to prevent relapse of *P. vivax* and *P. ovale* malarias and to prevent attacks after departure from areas where *P. vivax* and *P. ovale* malarias are endemic.
- Dose: 30mg PO daily x 14 days beginning immediately after leaving the malarious area
    - Screen for G6PD deficiency prior to dispensing.
    - Give with food to prevent gastric irritation.
- **Contraindications:**
    - G6PD deficiency
    - Rheumatoid Arthritis

    - SLE
    - Pregnancy
- Pregnancy Category C
- Side-effects:
    - Darkening of urine
    - Fevers
    - Chills
    - Cyanosis
    - Nausea
    - Vomiting
    - Abdominal cramps
- Adverse reactions:
    - Visual disturbances
    - Hypertension
    - Anemia/leukopenia
    - Methemoglobinemia
- TMEP use:
    - *Malaria Protocol*

Procardia®- See Nifedipine

Promethazine HCl (Phenergan®)

-

GROUNDING medication for personnel on flight status
- Description: Phenothiazine class. An H_1 receptor blocking agent. Antihistamine, sedative, antimotion-sickness, antiemetic, and anticholinergic effects. The duration of action is generally from four to six hours. The major side-effect this drug is sedation.
- Indications:
    - Antihistamine for allergies
    - Anaphylactic reactions in addition to epinephrine.
    - Nausea
    - Vomiting
    - Motion sickness.
    - Antiemetic therapy
- Adult dose:
    - Oral dose
        - Nausea / vomiting: The average adult dose is 25mg q 4 hr.
        - Motion sickness: The average adult dose is 25mg bid. The initial dose should be taken one-half to one hour before anticipated travel and be repeated 8-12 hours later if necessary. On succeeding days of travel, it is recommended that 25mg be given on arising and again before the evening meal.
    - Parenteral: administered by deep IM injection
        - Nausea / vomiting: 12.5-25mg q 4-6 hr PRN. If taking narcotics or barbiturates, it may be necessary to reduce doses of those medications to prevent excess somnolence.
        - Motion sickness: 12.5-25mg; repeat PRN up to 4 times/day
- *Pediatric dose:*
    - *Oral dose:*
        - *Nausea / vomiting*
            - *2-12 years old: 1.1mg/kg of body weight. Do not exceed half of the suggested adult dose.*
            - *Children < 2 years old:* ***Contraindicated***
        - *Motion Sickness:* ***Contraindicated*** *in children*
    - *Parenteral: administered by deep IM injection*
        - *Nausea / vomiting :*

        - *2 to 12 years old: 12.5-25mg q 4-6hr PRN. If taking narcotics or barbiturates, reduce the dose to 1.1mg/kg.*
    - *Motion sickness: **Contraindicated** in children*
- **Contraindications:**
    -
    - Children < 2 years old
    - Comatose states
    - Antiemetics should not be used in vomiting of unknown etiology in children.
    - Asthma
- Pregnancy Category C
- Side-effects:
    - Drowsiness, sedation, sleepiness
    - Anticholinergic effects - dry mouth, urinary retention, dry eyes, constipation
    - Photosensitivity
    - Bradycardia.
    - Urticaria,
    - Sedation
    - Respiratory depression
    - Hypotension
    - Chest pain
- Adverse reactions:
    - Lowers seizure threshold
    - Extrapyramidal symptoms, dystonia
    - May exacerbate glaucoma
    - May exacerbate hypertension
    - Cholestatic jaundice
    - Arrhythmias
-

Warning:
    - Intra-arterial injection may result in gangrene of the affected extremity.
    - Because of the potential for promethazine (Phenergan®) to reverse epinephrine's vasopressors effect, epinephrine should **NOT** be used to treat hypotension associated with promethazine (Phenergan®) overdose.
    - Subcutaneous injection or IV infiltration may result in tissue necrosis
- Other notes:
    - Store at room temperature, between 59-77 °F (15-25 °C).
    - Protect from light.
    - Use carton to protect contents from light.
    - Do not use if solution is discolored or contains a precipitate.
    - IV administration may be hazardous and is **NOT** recommended
- TMEP use:
    - *Nausea and/or Vomiting Protocol*

Proventil®- See Albuterol Inhaler

Pseudoephedrine (Sudafed®)

- Description: Adrenergic class. Primary activity though α-effects on respiratory mucosal membranes reducing congestion, hyperemia, edema, and minimal bronchodilation secondary to β-effects.
- Indications:
    - Nasal decongestant
    - Adjunct in *otitis media* with antihistamines
- Adult dose:
    - 30-60mg q 4-6hr PO
- *Pediatric dose:*

- *6-12 years old: 30mg/dose PO q 4-6hr*
- *2-5 years old: 15mg/dose PO q 4-6hr*

- **Contraindications:**
  - Hypersensitivity
  - Narrow angle glaucoma
- Pregnancy Category C
- Precautions:
  - Pregnancy
  - Cardiac disorders
  - Hyperthyroidism
  - Diabetes mellitus
  - Prostatic hypertrophy
  - Lactation
  - Hypertension
- Side-effects:
  - CNS: Tremors, anxiety, insomnia, headache, dizziness, hallucinations, seizures
  - CV: Palpitations, tachycardia, hypertension, chest pain, dysrhythmias
  - EENT: Dry nose, irritation of nose and throat
  - GI: Nausea, vomiting, anorexia, dry mouth
  - GU: dysuria
- Other notes:
  - Do not use continuously, or more than recommended dose.
  - Rebound congestion may occur.
  - Avoid taking at bedtime, stimulation may occur.
- TMEP use:
  - Allergic Rhinitis/Hay Fever/ Cold Like Symptoms
  - *Barotrauma Protocol*

Quinolones - General Antimicrobial Spectrum

- **WARNING** Aviation personnel are grounded for the initial 24 hours of antibiotic therapy and until the medical condition no longer interferes with safely performing aviation duties and the patient is free of side-effects.
- 1ST generation: Gram negative (excluding Pseudomonas), urinary tract only.
  - *Example nalidixic acid*
- 2nd generation: Gram negative (including Pseudomonas); *Staph aureus* but not *Pneumococcus*; some atypicals.
  - *Examples: ciprofloxacin, norfloxacin, ofloxacin*
- 3rd generation: Gram negative (including Pseudomonas); gram positive (including *Staph aureus* and *Pneumococcus*); expanded atypical coverage.
  - *Example: levofloxacin*
- 4th generation: Same as 3rd generation: plus broad anaerobic coverage.
  - *Examples: gatifloxacin, moxifloxacin, trovafloxacin*
- **Contraindications:** Known allergy to medication
- Pregnancy Category C

Rabeprazole (Aciphex®)

- Description: GI agent - proton pump inhibitor (PPI)
- Gastric PPI that specifically suppresses gastric acid secretion by inhibiting the acid secretion in the cells of the stomach. Does not have H2 histamine receptor blocking properties.
- Indications: For healing and maintenance of erosive or ulcerative gastroesophageal reflux disease (GERD), duodenal ulcers and hypersecretory conditions.
- **Contraindications:**
  - PPI hypersensitivity
  - Pregnancy

- Pregnancy Category B
- Adult dose:
  - 20mg PO qd
- *Pediatric dose:*
  - ***Contraindicated***.
- Side-effects:
  - Headaches
  - Nausea
  - Vomiting
  - Diarrhea
  - Abdominal cramps
  - ↑ temperature
- Adverse reactions:
  - Stevens-Johnson Syndrome
  - Toxic epidermal necrolysis (Fatalities have been reported.)
- Other notes:
  - This medication should be swallowed whole. It should not be crushed or chewed.
- TMEP use:
  - *Abdominal Pain Protocol*

Ranitidine (Zantac®)

-
WARNING Aviation personnel are grounded for 72-hours when taking an H2 blocker for the first time. There is no grounding period if aviation personnel have taken before without any no side-effects.
- Description: H2 blocker; ↓ secretion of stomach acid
-

Note: Drug Interactions: ↓absorption of oral diazepam.
- Indications:
  - Gastric and/or peptic ulcers
  - Upper GI bleeds
  - Prevention of stress ulcers in burn victims or patients on steroid treatment.
  - Drug of choice for treatment of gastric or peptic ulcers.
  - Adjunct in treatment of urticaria and anaphylaxis.
- Adult dose:
  - 50mg IV / IM q 6-8hr for ulcers, burns, steroid use, upper GI bleeds, urticaria, or anaphylaxis.
  - Oral dose: 150mg bid for ulcer, urticaria.
- *Pediatric dose: 1.5mg/kg IV x 1, then 0.75mg/kg IV q 12hr*
- **Contraindications:**
  - Known/suspected liver disease
- Pregnancy Category B
- Side-effects:
  - Headache
  - Diarrhea
  - Constipation
  - Muscle aches
  - Vertigo
  - Malaise
  - Dry mouth
  - Nausea
  - Vomiting
- Adverse reactions:
  - Thrombocytopenia

    - Liver toxicity
- TMEP use:
    - *Abdominal Pain Protocol*
    - *Anaphylactic Reaction Protocol*
    - *Chest Pain Protocol* (Other Etiologies)

Retrovir®- See AZT (zidovudine)

Rifadin®- See Rifampin

Rifampin (Rifadin®)

- **WARNING** Aviation personnel are grounded for the initial 24 hours of antibiotic therapy and until the medical condition no longer interferes with safely performing aviation duties and the patient is free of side-effects.
- Description: Inhibits DNA-dependent RNA polymerase
- Class: Bactericidal antibiotic
    - Indications:
    - Tuberculosis
    - Anthrax
    - Brucellosis
    - Asymptomatic carriers of *Neisseria meningitidis* to eliminate meningococci from the nasopharynx
    - MRSA soft tissue infections
- Dose:
    - 600mg PO bid
- **Contraindications:**
    - Liver dysfunction
- Pregnancy Category C
- Side-effects/precautions:
    - Hepatotoxic
        - Hepatitis
        - Jaundice
        - Liver failure in severe cases
    - Respiratory
        - Shortness of breath
        - Wheezing
    - Cutaneous
        - Flushing
        - Pruritus
        - Rash
        - Redness and watering of eyes
    - Abdominal
        - Nausea
        - Vomiting
        - Abdominal cramps
        - Diarrhea
        - Jaundice
        - Flatulence
- Warnings:

- o

Concomitant antacid administration may reduce the absorption of rifampin. Daily doses of rifampin should be given at least 1 hour before the ingestion of antacids.
- o

Rifampin and its metabolites may impart a red-orange color to urine, feces, sputum, sweat and tears; soft contact lenses worn during rifampin therapy may become permanently stained
- TMEP use:
  - o *Cellulitis/ Cutaneous Abscess Protocol*

Ritonavir and lopinavir - See Kaletra®

Rocephin® (Ceftriaxone Sodium)

Salmeterol (Serevent®)

- Description: Long acting inhaled beta-2 adrenergic agonist; relaxes bronchial smooth muscle (bronchodilator)
- Indications:
  - o Relief of asthma
  - o Prevention/treatment of exercise-induced bronchospasm
  - o Treatment for chronic obstructive pulmonary disease (COPD)
  - o Nocturnal asthma
  - o HAPE prophylaxis/treatment
- Adult dose:
  - o 1 inhalation q 12hr (twice daily)
- *Pediatric dose:*
  - o *If more than 4 years of age, same as adult dose*
- **Contraindications:**
  - o Hypersensitivity to salmeterol or other beta-2 agonists
- Pregnancy Category C
- Side-effects:
  - o Dry mouth/throat (sugarless hard candy or ice chips will often relieve symptoms)
- Adverse reactions:
  - o Cardiovascular: tachyarrythmias
  - o Neurologic: dizziness, headache, tremor
  - o Respiratory: throat irritation, also exacerbation of asthma (severe)
- Caution:
  - o This medication **DOES NOT** give immediate relief in the event of asthma attack or bronchospasm
  - o This medication **SHOULD NOT** be used in combination with other long-acting inhaled beta-agonists (e.g., formoterol, salmeterol/fluticasone)
  - o Milk allergy; milk protein in the inhalation powder formulation
- TMEP use:
  - o *Altitude Illness Protocol*

Septra®- See trimethoprim-sulfamethoxazole

Serevent®- See salmeterol

Sildenafil (Viagra®)

- Class: PDE5 inhibitor.
- Action: Vasodilator with potential blood pressure lowering effects
- Dose: 50mg
- Contraindications:
    - Nitrates - Concomitant use of nitrates in any form. Tadalafil potentiates the hypotensive effects of nitrates
- Pregnancy Category B
- Side Effects:
    - Cardiovascular- angina pectoris, chest pain, hypotension, myocardial infarction, postural hypotension, tachycardia
    - Digestive - dry mouth, dysphagia, esophagitis, gastritis,
    - Ophthalmologic- blurred vision, conjunctivitis (including conjunctival hyperemia), eye pain
- Warnings:
    - Alpha Blockers: coadministration may potentiate the blood pressure lowering effects of alpha blockers.
    - Antihypertensive: coadministration may potentiate the blood pressure lowering effects of alpha blockers.
    - Antacids: simultaneous administration of antacids reduces the absorption of Cialis
    - Ritonavir and HIV Protease Inhibitors: Increased tadalafil absorption.
- TMEP Use:
    - Altitude Illness Protocol

Sodium Bicarbonate

-

GROUNDING medication for personnel on flight status.
- Description: Alkalinizing agent, electrolyte
- Action:
    - Sodium bicarbonate combines with hydrogen ions to form water and carbon dioxide
    - Buffers metabolic acidosis
    - Forces an intracellular shift of excess potassium in hyperkalemia
    - Increased pH
- Indications:
    - Severe metabolic acidosis in cardiac arrest refractory to ventilation
    - Tricyclic antidepressant overdose
    - Hyperkalemia
    - Alkalinization agent for specific toxins (Salicylates, Phenobarbital)
- Dose:
    - 1mEq/kg IV
- **Contraindications:**
    - Metabolic or respiratory alkalosis
    - Hypocalcemia
    - Hypokalemia
    - Hypernatremia
- Pregnancy Category C
- Side-effects/precautions:
    - Metabolic alkalosis may occur
    -

Precipitates when mixed with calcium chloride or gluconate
    - May increase intracellular acidosis
    - May cause imbalance
    - May deactivate catecholamine
    - Large solute load may lead to fluid overload
- TMEP use:
    - *Crush Injury Protocol*

Sudafed®- See Pseudoephedrine

Tadalafil (Cialis®)

- Class: PDE5 inhibitor.
- Action: Vasodilator with potential blood pressure lowering effects
- Dose: 10mg
- Contraindications:
  - Nitrates - Concomitant use of nitrates in any form. Tadalifil potentiates the hypotensive effects of nitrates
- Pregnancy Category B
- Side Effects:
  - Cardiovascular - angina pectoris, chest pain, hypotension, myocardial infarction, postural hypotension, tachycardia
  - Digestive - dry mouth, dysphagia, esophagitis, gastritis,
  - Ophthalmologic- blurred vision, conjunctivitis (including conjunctival hyperemia), eye pain
- Warnings:
  - Alpha Blockers: coadministration may potentiate the blood pressure lowering effects of alpha blockers.
  - Antihypertensive: coadministration may potentiate the blood pressure lowering effects of alpha blockers.
  - Antacids: simultaneous administration of antacids reduces the absorption of Cialis
  - Ritonavir and HIV Protease Inhibitors: Increased tadalafil absorption.
  - Rifampin: reduced tadalafil absorption 46%. The reduced exposure of tadalafil with the coadministration of rifampin can be anticipated to decrease the efficacy of tadalafil for once daily use; the magnitude of decreased efficacy is unknown.
- TMEP Use:
  - *Altitude Illness Protocol*

Tenofovir (Viread®)

- **WARNING** GROUNDING medication for personnel on flight status.
- Indications: Treatment of HIV
- Dose:
  - 1 pill daily
- **Contraindications:** Known allergy to medication
- Pregnancy Category B
- Side-effects:
- Immune system disorders
  - Allergic reaction
- Metabolism and nutrition disorders
  - Lactic acidosis
  - Hypokalemia
  - Hypophosphatemia
- Respiratory, thoracic , and mediastinal disorders
  - Dyspnea
- Gastrointestinal disorders
  - Pancreatitis
  - Increased amylase
  - Abdominal pain
- Hepatobiliary disorders
  - Hepatic steatosis
  - Hepatitis

    - Increased liver enzymes (most commonly AST, ALT gamma GT)
- Skin and subcutaneous tissue disorders
    - Rash
- Musculoskeletal and connective tissue disorders
    - Rhabdomyolysis,
    - Osteomalacia (manifested as bone pain and which may contribute to fractures)
    - Muscular weakness
    - Myopathy
- Renal and urinary disorders
    - Acute renal failure
    - Nephrogenic diabetes insipidus
    - Renal insufficiency
    - Proteinuria
- General disorders
    - Weakness
    - Fatigue
- TMEP use:
    - *HIV Post Exposure Prophylaxis Protocol*

Tenofovir and Emtricitabine - See Truvada®

Tenofovir and Emtricitabine and Efavirenz - See Atripla®

Tetracaine 0.5% Drops

- **WARNING** Aviation personnel are grounded for 12 hours after the use of local anesthesia and until symptoms have resolved enough to allow safe performance of duties.
- Description: Local anesthetic
- Indications: As a topical optic anesthetic (may aid in ocular exam to relieve blepharospasm); removal of foreign bodies
- Dose:
    - 1 or 2 drops - 2-3 minutes before procedure
    - See appropriate TMEP
- **Contraindications:**
    - Not for prolonged use
- Pregnancy Category C
- Side-effects:
    - Stinging
    - Tearing
    - Swelling
    - Sensitivity to light
- Adverse reactions:
    - Conjunctival redness
    - Transient eye pain
    - Hypersensitivity reactions
- TMEP use:
    - *Corneal Abrasion, Corneal Ulcer, Conjunctivitis Protocol*

Toradol®- See ketorolac

Tranexamic acid (TXA) (Cyklokapron®)

- Class: Antifibrinolytic agent.

- Action: Competitive inhibitor of plasminogen activation→ stabilizes clots.
- Indications:
  - (Off label) Combat casualties at high risk for requiring massive blood transfusion (e.g.: presenting with hemorrhagic shock, penetrating torso trauma, multiple major amputation, or clinical evidence of severe blood loss).
- Dose: Adult 1 gm IV/IO for two doses
- K-9 Dose: 10-15 mg/kg IV
- **Contraindications**:
  - Subarachnoid hemorrhage.
  - Active intravascular clotting.
  - Known hypersensitivity
- Pregnancy Category B
- Side Effects:
  - Cardiovascular- angina pectoris, chest pain, hypotension, myocardial infarction, postural hypotension, tachycardia
  - Digestive - dose related nausea, vomiting, and diarrhea.
  - Ophthalmologic- blurred vision, conjunctivitis (including conjunctival hyperemia), eye pain, color blindness
- Warnings:
  - Rapid administration may result in hypotension.
  - Do not coadminister with blood products or Hextend®.
  - Do not administer more than 3 hours after injury.
- TMEP Use:
  - K-9 Trauma Management Protocol
  - Tactical Field Care and Tactical Evacuation Care protocols

Trimethoprim-sulfamethoxazole (TMP-SMZ, Bactrim®, Septra®)

- **WARNING** Aviation personnel are grounded for the initial 24 hours of antibiotic therapy and until the medical condition no longer interferes with safely performing aviation duties and the patient is free of side-effects.
- Description: Antimicrobial - antibacterial, sulfonamide
- Action:
  - Fixed combination of TMP and SMZ, synthetic folate antagonists and enzyme inhibitors that prevent bacterial synthesis of essential nucleic acids and proteins; effective against *Pneumocystis carinii* pneumonitis, Shigellosis enteritis, most strains of enterobacteriaceae, *Nocardia, Legionella micdadei, and Legionella pneumophila, and Haemophilus ducreyi*
- Indications:
  - Cellulitis
  - Enteritis
  - Urinary tract infections
- Adult dose: 160mg TMP/800mg SMZ (DS) PO bid
- K-9 Dose: K-9 Dose: 15-30 mg/kg PO q12-24 hr (Skin Infection/UTI)
- **Contraindications:**
  - TMP, SMZ, sulfonamide, or bisulfite hypersensitivity
  - Group A beta-hemolytic streptococcal Pharyngitis
  - Use caution with severe allergy or bronchial asthma
  - G6PD deficiency
  - Pregnancy
- Pregnancy Category C

- Adverse effects:
  - Rash
  - Toxic epidermal necrolysis
  - Nausea and vomiting
  - Diarrhea
  - Pseudomembranous enterocolitis
  - Abdominal pain
- TMEP use:
  - *Cellulitis/Cutaneous Abscess Protocol*
  - *Urinary Tract Infection Protocol*

Truvada® (emtricitabine and tenofovir)

- **WARNING** GROUNDING medication for personnel on flight status.
- Indications: Treatment of HIV
- Dose:
  - Adult Dose: 1 tablet daily
- **Contraindications:** Known allergy to medication
- Pregnancy Category B
- Side-effects:
  - General
    - Fatigue
  - Infections
    - Sinusitis
    - Upper respiratory infections
    - Nasopharynigitis
  - CNS
    - Headache
    - Dizziness
  - Psychiatric
    - Depression
    - Insomnia
  - Immune system disorders
    - Allergic reaction
  - Metabolism and nutrition disorders
    - Lactic acidosis
    - Hypokalemia
    - Hypophosphatemia
  - Respiratory, thoracic, and mediastinal disorders
    - Dyspnea
  - Gastrointestinal disorders
    - Pancreatitis
    - Increased amylase
    - Abdominal pain
    - Nausea
    - Vomiting
    - Diarrhea
  - Hepatobiliary disorders
    - Hepatic steatosis
    - Hepatitis
    - Increased liver enzymes (most commonly AST, ALT gamma GT)
    - Jaundice
  - Skin and subcutaneous tissue disorders
    - Rash
  - Musculoskeletal and connective tissue disorders
    - Rhabdomyolysis

        - Osteomalacia (manifested as bone pain and which may contribute to fractures), muscular weakness, myopathy
    - Renal and urinary disorders
        - Acute renal failure
        - Nephrogenic diabetes insipidus
        - Renal insufficiency
        - Proteinuria
        - Polyuria
    - General disorders and administration site conditions
        - Fatigue
- Other notes:
    - Store at 77 °F (25 °C), excursions permitted to 59-86 °F (15-30 °C).
- TMEP use:
    - *HIV Post Exposure Prophylaxis Protocol*

Tylenol®- See acetaminophen

Valium®- See diazepam

Ventolin®- See albuterol inhaler

Viagra®- see sildenafil

Viread®- See tenofovir

Viracept®- See nelfinavir

Xylocaine®- See lidocaine HCL

Z- Pak®- See azithromycin

Zantac®- See ranitidine

Zidovudine - See AZT

Zithromax®- See azithromycin

Zofran®- See ondansetron

Zidovudine (AZT, ZDV) and lamivudine - See Combivir®

Zymar®- See gatifloxacin 0.3% Ophthalmic Liquid

MASTER DRUG LIST						
Common Name	Nomenclature	AHFS Category	NSN	Recommended NDC	Controlled	JDF status
acetaminophen (Tylenol) 325mg tablet 100s	acetaminophen 325mg tablet 100s	analgesics and antipyretics, misc	6505015302679	51111048878	No	Yes
acetaminophen (Tylenol) 500mg tablets USP 100s	acetaminophen tablets USP 500mg 100s	analgesics and antipyretics, misc	6505014367129	51079039620	No	Yes
acetazolamide (Diamox) tablets 250mg 100 tablets per bottle	acetazolamide tablets USP 250mg 100 tablets per bottle	carbonic anhydrase inhibitors	6505006640857	51672402301	No	Yes
albuterol sulfate (CFC-F) inhalation 90mcg aer w/adap 6.7 gm 200 actuations	albuterol sulfate (CFC-F) inhalation 90mcg aer w/adap 6.7gm 200 actuations	sympathomimetic (adrenergic) agents	6505015382871	00085113201	No	Yes
aspirin (St Josheph's Children's Aspirin) 81mg tab chew 36s	aspirin 81mg tab chew 36s	salicylates	6505010339866	00904404073	No	Yes
aspirin tablets USP 0.324gm 100s	aspirin tablets USP 0.324gm 100s	salicylates	6505001009985	00904200960	No	Yes
atovaquone 250mg & proguanil 100mg tablets (Malarone) 100s	atovaquone 250mg & proguanil 100mg tablets 100s	antiprotozoals, misc	6505014919430	00173067501	No	Yes
azithromycin tablets 250mg 18s (3 Z-Paks 6s)	azithromycin tablets 250mg 18s (3 Z-Paks 6s)	Other macrolides	6505014491618	00781149668	No	Yes
bisacodyl (Dulcolax) tablets USP 5mg film enteric I.S. 100s	bisacodyl tablets USP 5mg film enteric I.S. 100s	cathartics and laxatives	6505001182759	00574000411	No	Yes
ceftriaxone sodium (Rocephin) 1gm vial 10s	ceftriaxone sodium 1gm vial 10s	3rd generation cephalosporins	6505012192760	00004196401	No	Yes
ceftriaxone sodium sterile (Rocephin) USP 2gm vial 10 vials per package	ceftriaxone sodium sterile USP 2gm vial 10 vials per package	cephalosporins	6505012293149	00781320995	No	Yes
cephalexin (Keflex) 250mg capsules 100s	cephalexin 250mg capsules 100s	1st generation cephalosporins	6505001656545	00093314501	No	Yes
chloroquine phosphate tablets USP 500mg 25 tablets per bottle	chloroquine phosphate tablets USP 500mg 25 tablets per bottle	antimalarials	6505012679662	00143212522	No	Yes

ciprofloxacin (Cipro) 400mg in 200ml D5W piggyback bags 24s	ciprofloxacin 400mg in 200ml D5W piggyback bags 24s	quinolones	6505013366179	00085174102	No	Yes
ciprofloxacin concentrate (Cipro) for injection 10mg/ml, 40ml vi	ciprofloxacin concentrate for injection 10mg/ml, 40ml vial 10s	quinolones	6505014866591	00085173101	No	Yes
ciprofloxacin (Cipro) tab USP 500mg I.S. 100s	ciprofloxacin tablets USP 500mg I.S. 100s	quinolones	6505012738650	00172531210	No	Yes
ciprofloxacin (Cipro) tablets USP 500mg I.S. 30 tablets per pack	ciprofloxacin tablets USP 500mg I.S. 30 tablets per package	quinolones	6505014912834		No	Yes
dexamethasone sodium phosphate injection (Decadron) 4mg/ml 30ml	dexamethasone sodium phosphate injection 4mg/ml 30ml	adrenals	6505015225164	63323016530	No	Yes
dextrose tablets 45gm multi-use squeeze tube 12 tablets	dextrose tablets 45gm multi-use squeeze tube 12 tablets	caloric agents	6505014253165	08290328230	No	No
diazepam (Valium) 5mg tablets I.S. 100s	diazepam 5mg tablets I.S. 100s	benzodiazepines	6505010985802	51079028521	Yes	Yes
diazepam (Valium) 5mg/ml, 2ml autoinjector (cana)	diazepam 5mg/ml, 2ml autoinjector (cana)	benzodiazepines	6505012740951		Yes	Yes
diazepam (Valium) inj 5mg/ml MDV 5s	diazepam injection 5mg/ml MDV 5s	benzodiazepines	6505015138434	00409321302	Yes	Yes
diazepam (Valium) injection 5mg/ml 2ml syringe luer-lock, w/o ne	diazepam injection USP 5mg/ml 2 ml unit 10 per package	benzodiazepines	6505015053476	00409127332	Yes	Yes
diphenhydramine hydrochloride (Benadryl) capsules USP 50mg 100s	diphenhydramine hydrochloride capsules USP 50mg 100s	ethanolamine derivatives	6505001168350	00555005902	No	Yes
diphenhydramine hydrochloride (Benadryl) inj USP 50mg/ml 1ml carpuject 10s	diphenhydramine hydrochloride inj USP 50mg/ml 1ml carpuject 10s	ethanolamine derivatives	6505015182962	00409229031	No	Yes
diphenhydramine hydrochloride (Benadryl) inj USP 50mg/ml 1ml vi	diphenhydramine hydrochloride inj USP 50mg/ml 1ml vial 25s	ethanolamine derivatives	6505010917538	00641037625	No	Yes

epinephrine injection (Adrenaline) USP 0.1mg/ml 10ml Lifeshield syringe 10s	epinephrine injection USP 0.1mg/ml 10ml Lifeshield syringe 10s	sympathomimetic (adrenergic) agents	6505015273957	00074492134	No	Yes
epinephrine injection (Adrenaline) USP 0.1mg/ml syringe-needle unit10ml10s	epinephrine injection USP 0.1mg/ml syringe-needle unit10ml10s	sympathomimetic (adrenergic) agents	6505010932384	00074490118	No	Yes
ertapenem sodium (Invanz) 1gm vial 10s	ertapenem sodium 1gm vial 10s	carbapenems	6505015035374	00006384371	No	Yes
fentanyl citrate Injection, USP, equivalent to 50 mcg (0.05 mg) fentanyl base per mL	fentanyl citrate injection, USP	opiate agonists	6505011210705	10019003574	No	No
fluconazole (Diflucan) tablets 100mg 100 tablets per package	fluconazole tablets 100mg 100 tablets per package	azoles	6505013198233	00049342041	No	No
fluconazole tablets (Diflucan)100mg 30 tablets per bottle	fluconazole tablets 100mg 30 tablets per bottle	azoles	6505013198248	00049342030	No	No
gatifloxacin (Zymar) ophthalmic solution 0.3% 2.5ml	gatifloxacin ophthalmic solution 0.3% 2.5ml	antibacterials	6505015090735	00023921803	No	No
hetastarch 6% in lactated electrolytes (Hextend) 500ml plastic bag	hetastarch 6% in lactated electrolytes 500ml plastic bag 12s	replacement preparations	6505014988636	00409155554	No	Yes
hetastarch 6% in sodium chloride (Hespan) 500ml plastic bag 12s	hetastarch 6% in sodium chloride 500ml plastic bag (Hespan) 12s	replacement preparations	6505012811247	00264196510	No	Yes
ibuprofen tablets (Motrin) USP 400mg 500s	ibuprofen tablets USP 400mg 500s	other nonsteroidal anti-inflammatory agents	6505001288035	53746013105	No	Yes
ibuprofen tablets (Motrin) USP 800mg 500 tablets per bottle	ibuprofen tablets USP 800mg 500 tablets per bottle	other nonsteroidal anti-inflammatory agents	6505012149062	53746013705	No	Yes
lamivudine 150mg & zidovudine 300mg (Combivir) capsules 60s	lamivudine 150mg & zidovudine 300mg (Combivir) capsules 60s	nucleoside and nucleotide reverse transcriptase inhibitors	6505014629945	00173059500	No	Yes

levofloxacin (Levaquin) in dextrose 5mg/ml 100ml	levofloxacin in dextrose 5mg/ml 100ml	quinolones	6505014974346	00045006801	No	Yes
levofloxacin (Levaquin) injection 25mg/ml, 20ml single dose vial	levofloxacin injection 25mg/ml, 20ml single dose vial	quinolones	6505014448356	00045006951	No	Yes
levofloxacin (Levaquin) tablets 500mg I.S. 100s	levofloxacin tablets 500mg I.S. 100s	quinolones	6505014446635	00045152510	No	Yes
lidocaine hydrochloride (Xylocaine) 2% injection USP 20ml vial	lidocaine hydrochloride 2% injection USP 20ml vial	local anesthetics	6505005986117	00186012001	No	Yes
loperamide hydrochloride (Imodium) capsules 2mg I.S. 100 capsule	loperamide hydrochloride capsules 2mg I.S. 100 capsules/package	antidiarrhea agents	6505012385632	51079069020	No	Yes
mefloquine hydrochloride (Lariam) tablets 250mg I.S. 25s	mefloquine hydrochloride tablets 250mg I.S. 25s	antimalarials	6505013151275	00004017202	no	Yes
meloxicam (Mobic)15mg tablets 100s	meloxicam 15mg tablets 100s	nonsteroidal anti-inflammatory agents	6505015413243	00597003001	No	Yes
metronidazole HCL (Flagyl IV RTU) 500mg in 100ml sodium chloride	metronidazole hcl 500mg in 100ml sodium chloride piggyback bags 24s	antiprotozoals, misc	6505014626450	00338105548	No	Yes
metronidazole (Flagyl) tablets USP 250mg I.S. 100s	Metronidazole tablets USP 250mg I.S. 100s	antiprotozoals, misc	6505011424914	00182133089	No	Yes
morphine sulfate 15 mg/ml injection 20ml	morphine sulfate 15 mg/ml injection 20ml	opiate agonists	6505011533284	10019017963	Yes	Yes
morphine sulfate injection 10mg automatic injector	morphine sulfate injection 10mg automatic injector	opiate agonists	6505013025530		Yes	Yes
morphine sulfate injection 10mg/ml 1ml vial 25 per package	morphine sulfate injection 10mg/ml 1ml vial 25 per package	opiate agonists	6505014830274	10019017844	Yes	Yes
morphine sulfate injection 10mg/ml, 1ml cartridge unit, luer-lock, needleless	morphine sulfate injection 10mg/ml, 1ml cartridge unit, luer-lock, needleless, 10s	opiate agonists	6505015055813	00409126130	Yes	Yes

moxifloxacin hydrochloride (Avelox)	moxifloxacin hydrochloride	quinolones	6505015034772	00026858169	No	No
moxifloxacin hydrochloride (Avelox) tablets 50s	moxifloxacin hydrochloride tablets 50s	quinolones	6505015163194	00026858188	No	No
moxifloxacin (avelox) hydrochloride tablets 5s	moxifloxacin hydrochloride tablets 5s	quinolones	6505015163201	00026858141	No	No
mupirocin (Bactroban) 2% ointment 22gm	mupirocin 2% ointment 22gm	antibacterials	6505014805678	00029152544	No	Yes
naloxone HCL (Narcan) 1mg/ml injection 2ml syringe 10s	naloxone HCL 1mg/ml injection 2ml syringe 10s	opiate antagonists	6505014070213	00548146900	No	Yes
naloxone HCL inj (Narcan) 0.4mg/ml 1ml vial 10s	naloxone hydrochloride inj 0.4 mg/ml 1ml vial 10s	opiate antagonists	6505015334126	00409121501	No	Yes
naloxone hydrochloride (Narcan) injection USP 0.4mg/ml 1ml ampul	naloxone hydrochloride injection USP 0.4mg/ml 1ml ampul 10/bx	opiate antagonists	6505000797867	63481035810	No	Yes
nelfinavir mesylate (Viracept) tablets 300 tablets per bottle	nelfinavir mesylate tablets 300 tablets per bottle	antivirals	6505014876694	63010001030	No	No
neomycin, polymyxin B sulfate, & hydrocortisone (Cortisporin) otic	neomycin, polymyxin B sulfate, & hydrocortisone otic susp USP 10ml	antibacterials	6505010430230	24208063562	No	Yes
Nifedipine (Procardia) capsules USP 10mg 100 capsules per bottle	Nifedipine capsules USP 10mg 100 capsules per bottle	dihydropyridines	6505011263842	00069260066	No	No
norfloxacin tablets 400mg 100 tablets per bottle	norfloxacin tablets 400mg 100 tablets per bottle	quinolones	6505012589542	00006070568	No	No
ofloxacin (Floxin) in dextrose injection 4mg/ml 100ml bottle 12/package	ofloxacin in dextrose injection 4mg/ml 100ml bottle 12/package	quinolones	6505013644123	00062155201	No	No
ofloxacin (Floxin) otic soluion 0.3% 0.25ml single dose dropperette 20s	ofloxacin otic soluion 0.3% 0.25ml single dose dropperette 20s	antibiotics	6505015424952	63395010111	No	No
ofloxacin (Floxin) tablets 200mg 50 tablets per bottle	ofloxacin tablets 200mg 50 tablets per bottle	quinolones	6505013464882	00062154002	No	No

ofloxacin (Floxin) tablets 200mg I.S. 100 tablets per package	ofloxacin tablets 200mg I.S. 100 tablets per package	quinolones	6505013462056	00062154005	No	No
Ofloxacin (Floxin) tablets 300mg 50 tablets per bottle	ofloxacin tablets 300mg 50 tablets per bottle	quinolones	6505013462053	00062154102	No	No
ondansetron hydrochloride (Zofran) injection 2mg/ml 20ml vial	ondansetron hydrochloride injection 2mg/ml 20ml vial	5-ht3 receptor antogonists	6505013366184	00173044200	No	Yes
ondansetron (Zofran) hydrochloride injection 2mg/ml 2ml vial 5/package	ondansetron hydrochloride injection 2mg/ml 2ml vial 5/package	5-ht3 receptor antogonists	6505013945963	00173044202	No	Yes
oxymetazoline hydrochloride (Afrin) nasal solution 15ml spray	oxymetazoline hydrochloride nasal solution 15ml spray	vasoconstrictors	6505008694177	00182144464	No	Yes
Primaquine Phosphate tablets USP 15mg 100s	Primaquine Phosphate tablets USP 15mg 100s	antimalarials	6505013482465	00024159601	No	Yes
promethazine hydrochloride (Phenergan) injection USP 25mg/ml 10ml	Promethazine hydrochloride injection USP 25mg/ml 10ml MDV 10s	antihistamine drugs	6505015401933	66758060119	No	Yes
promethazine hydrochloride (Phenergan) tablets USP 25 mg 100s	promethazine hydrochloride tablets USP 25 mg 100s	phenothiazine derivatives	6505013648557	00591530701	No	Yes
pseudoephedrine hydrochloride (Sudafed) tablets USP 30mg 24s	pseudoephedrine hydrochloride tablets USP 30mg 24s	sympathomimetic (adrenergic) agents	6505001490098	00904505324	Yes	Yes
Quinine Sulfate capsules USP 325mg 100 capsules per bottle	Quinine Sulfate capsules USP 325mg 100 capsules per bottle	antimalarials	6505009579532	00172417260	No	No
Quinine sulfate capsules usp 325mg 1000 capsules per bottle	Quinine Sulfate capsules USP 325mg 1000 capsules per bottle	antimalarials	6505010428040	52544071610	No	No
Quinine Sulfate tablets 260mg 100 tablets per bottle	Quinine Sulfate tablets 260mg 100 tablets per bottle	antimalarials	6505011137514	00172300160	No	No
Quinine Sulfate tablets USP 260 mg I.S. 100 tablets per package	Quinine Sulfate tablets USP 260 mg I.S. 100 tablets per package	antimalarials	6505012399803	47679050735	No	No

ranitidine (Zantac) injection USP 25mg/ml 2ml single dose vial 1	ranitidine injection USP 25mg/ml 2ml single dose vial 10/package	histamine H2-antagonists	6505012085955	00173036238	No	Yes
ranitidine (Zantac) tablets USP 150mg 60 tablets per bottle	ranitidine tablets USP 150mg 60 tablets per bottle	histamine H2-antagonists	6505011607702	00781188360	No	Yes
tetracaine hydrochloride (Pontocaine) ophthalmic solution 0.5% 15 ml	tetracaine hydrochloride ophthalmic solution 0.5% 15 ml	local anesthetics	6505005824737	24208092064	No	Yes
transmucosal fentanyl (Actiq) 400mcg, 30's	transmucosal fentanyl 400mcg, 30's	opiate agonists	6505NCM060544	63459050430	Yes	No

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CANINE TACTICAL COMBAT CASUALTY CARE (C-TCCC)

1. **General**

   a. Trauma care guidelines have been implemented for human combatants in the U.S. military, but appropriate parallel guidelines have not been established for multipurpose canines (MPCs) used by the U.S. Special Operations Command. Canine Tactical Combat Casualty Care (C-TCCC) guidelines were developed to align recommendations for canines with published TCCC guidelines familiar to military personnel. These C-TCCC guidelines should assist in standardization of care to these unique patients, while evolving to apply updated knowledge or new technologies to tactical care of these unique force assets.
   b. Multipurpose canines (MPCs) are increasingly used by the U.S. Special Operations Command as a force multiplier, serving as team members due to their exceptional skills in personnel, explosive, and contraband detection. Tactical Combat Casualty Care (TCCC) guidelines have been developed and successfully implemented for human combatants, with documented reduction in lives lost. Training in TCCC has led to questions by special operations medics and other USSOCOM personnel regarding the applicability of TCCC guidelines to their canine counterparts.
   c. Historical and epidemiological data regarding disease and injury in working dogs is very important in determining conditions associated with high mortality. However, a formalized system of data collection for tracking battlefield medical injuries in MPCs has not been established due to the relatively new use of these assets by USSOCOM. Compared to humans, the different size, stature, locomotion, and proportional conformation of torso-to-limbs for dogs suggest that the anatomic location or nature of battlefield injury will also differ between humans and canines. Differences in physiology and pharmacokinetics between humans and canines also dictate review of guidelines before assuming general applicability.
   d. To improve field management of MPC medical issues and develop applicable guidelines, an initial meeting was held in Tampa, FL, at the 2009 Special Operations Medical Association (SOMA) conference to form a committee that would address this need and develop Canine-TCCC (C-TCCC) guidelines.
   e. For continuity and uniformity, these guidelines have been developed using the TCCC guidelines as a template. Phases of Care have been used consistent with the most current guidelines and includes Care Under Fire, Tactical Field Care, and Tactical Evacuation Care (combining MEDEVAC and CASEVAC Care). Major differences between canine and human care guidelines are emphasized.
   f. Refer to the **C-TCCC Guidelines**.

2. **Hemostatic Agents.** The benefits of hemostatic agents have been demonstrated in animal models, although not published specifically in a canine model. It is assumed that these benefits, as well as potential side-effects, would be similar for canine as for human combatants.

3. **Pharyngeal and Surgical Airways**

   a. Airway management in working canines must be balanced between the need for adequate patient ventilation and safety of individuals working on/near the canine patient. Human safety usually necessitates muzzling of the canine patient, but muzzling restricts airflow to the patient, interferes with cooling mechanisms (i.e. panting), and increases the risk of aspiration if the canine vomits. Muzzling may not be required if the patient is unconscious or sedated.
   b. Laryngeal mask airways are not designed to be used with the canine anatomy and are typically unable to establish the necessary seal for safe and effective use. Proper head and neck placement can facilitate airflow. As with human patients, pulling the MPC's tongue forward can help open airways. Intubation should be attempted in the unconscious MPC before performing a surgical tracheotomy. Be prepared to remove the endotracheal tube if the MPC regains consciousness.
   c. Trauma to the head, pharynx, and/or larynx may compromise airflow and be life-threatening. Surgical tracheotomy may be indicated although placement of a large bore needle into the tracheal lumen may provide a sufficient supplemental air portal.

4. **Tension Pneumothorax.** Thoracic trauma is common in working canines on the battlefield. Tension pneumothorax may be more rapidly fatal in the canine, compared to humans, due to the fenestrated mediastinum found in most dogs, resulting in bilateral lung collapse. Patients in distress from pneumothorax, regardless of cause, are best managed by evacuating free pleural air and therefore, reestablishing normal thoracic pressure gradients. Wounds or thoracic wall defects should be sealed and covered. The canine hair coat makes obtaining a proper chest seal difficult. Reinforcement with additional dressings may be required to ensure a proper seal. Free pleural air can be evacuated with a syringe attached to a stopcock and connector tubing (if available) and small-bore (14-gauge or less) catheter or needle. Care must be taken not to produce additional lung trauma during thoracocentesis. The use of chest tubes in the C-TCCC model is not recommended. This care should occur further up the echelons of care.

5. **Intravenous (IV) Access and Intraosseous (IO) Infusion**

    a. Hemorrhagic shock is a recognized need for fluid resuscitation. Special Operations medics may have training in emergency placement of IV fluids in canine patients, but IV placement may be difficult in shock due to vasoconstriction. Catheters or needles that are larger than 18-gauge are typically too large for placement in peripheral (leg) veins in canine casualties. Historically, fluid therapy at point of injury has not been instrumental in survival rates of MPCs due to rapid evacuation times. New mission profiles may make this capability necessary in the future.
    b. Intraosseous devices using a manubrium route, while proven successful in combat on human casualties, have had little evaluation or use in canine patients. Military veterinarians can advise and train SOF medics on canine anatomic landmarks to aid in the successful use of IO devices in the tibial tuberosity, humeral head, or iliac crest. It is recommended that SOF medics do not place IO devices unless previously trained by a military veterinarian.

6. **Fluid Resuscitation.** Physiologic principles of fluid resuscitation are applicable to canine casualties. Colloid administration has been demonstrated to be effective in dogs and is used in civilian veterinary critical care. The effect of hetastarch products on platelet aggregation times has been documented in dogs, as in people, but its clinical impact is considered minimal and not a deterrent to judicious use.

7. **Battlefield Antibiotics.** The use of prophylactic antibiotics for canine patients with trauma and open wounds is routine, as it is with human patients. Antibiotic spectrum is generally similar as selected for human patients due to similarity in potential wound pathogens. Pharmacokinetics, e.g. absorption and excretion, of antibiotics in dogs often differs from humans. General extrapolations such as “Always use a human pediatric dose (e.g. for 35-40kg) for a working dog” or “Always use an adult human dose for an adult working dog” are invalid. The committee has sought to make recommendations in accordance with TCCC guidelines, making adjustments to ensure adequate systemic antibiotic concentrations in a typical MPC patient.

8. **Battlefield Analgesics.** Analgesia and pain management are advocated for the humane medical care of canine patients, but drug options are somewhat limited. Products beneficial in humans may be impractical for canine patients, e.g., oral transmucosal fentanyl citrate (OTFC) lozenges, or potentially toxic, e.g., acetaminophen. Among analgesics available to combatants through routine medical supply channels, morphine was considered by the committee to be the most practical analgesic for battlefield use in canine patients. Due to marked differences in metabolism and effect of opiates between species, significantly higher doses of morphine are required for dogs than people (on a mg/kg basis). Morphine is considered a respiratory depressant in dogs, although there may be initial respiratory stimulation. Dogs are sensitive to the emetic effects of morphine, and handlers should be prepared to immediately remove the muzzle after morphine administration to reduce the risk of aspiration.

9. **Oxygen Administration and Patient Monitoring.** The committee recognized that oxygen support may not be available on or near the battlefield, and most canine casualties will not require oxygen in the phases of care addressed in these guidelines. The potential for thoracic trauma however necessitates prudent patient monitoring of oxygenation. Pulse oximetry, using instrumentation for human casualties, is considered an effective indirect measurement of oxygen

saturation in critical canine patients. Oximeter readings, however, are impaired by the configuration of the sensor, hair, or poor peripheral vascular flow. Measurements should be taken on the tongue (most reliable), ear, prepuce, or vulva. If the patient is intubated, a handheld capnography device can be utilized on the end of the endotracheal or tracheotomy tube to monitor end tidal CO_2 and respirations.

10. **Blood Products.** Canine blood (erythrocyte) antigens compose more than a dozen blood group systems, which differ from human blood types. Limited product availability and projected need makes the use of prepared canine blood products impractical. Although dog-to-dog transfusion may be considered by a military veterinarian at higher levels of care, evaluation of major and minor incompatibility should nevertheless be performed by the veterinarian. Non-military or native dogs should not be used as blood donors due to the risk of transmission of blood-borne parasites and disease transmission, e.g., rabies.

11. **Hypothermia on the Battlefield.** Hypothermia is a documented independent predictor of mortality in combat, and management of hypothermia has been added to recent TCCC guidelines. In the face of hypothermia, non-human mammals are generally more adept at maintaining core body temperature than humans. However, sedation, loss of consciousness, and trauma in MPCs can blunt these protective mechanisms. The smaller body size of canine patients facilitates the use of issued or improvised warming or protective blankets to keep the patient warm and dry.

12. **Burns.** Burn injury is infrequent in military dogs due to the lack of flammable clothing or outer garments and the protective nature of the dog's natural haircoat. As such, the committee has elected to omit this topic as a part of guidelines for standard battlefield care. Burns on canine patients may be covered with dry, sterile dressings. Additional care includes preventing hypothermia, airway management, and providing aggressive fluid management and analgesia to the canine burn patient.

13. **Tourniquets**

    a. Tourniquet use is a recognized life-saving method in the TCCC guidelines, preventing exsanguination following vascular injury to the extremities. Canine extremities are a smaller proportion of body composition than in people, and while preliminary data shows that extremity injuries are the most common canine battlefield injury, they are less likely to be life threatening than a similar injury in a person. Tactical experience has shown that nearly all canine extremity bleeding can be controlled through the use of pressure dressings and hemostatic agents. Historically, tourniquets have rarely, if ever, been needed to control extremity bleeding in the MPC.
    b. Life-threatening exsanguinating injuries to canines are more likely to occur in non-compressible areas such as the thorax or abdomen. Furthermore, proper tourniquet application can be hindered by the tapered shape of the canine leg and the width of many commercially available tourniquets potentially carried by combatants, resulting in venous but not arterial occlusion.
    c. Commercially available tourniquets, e.g., combat application tourniquet or Special Operations force tactical tourniquet, can be effective in canine limb injury if properly placed and secured above a bony protuberance, e.g., olecranon or greater trochanter. Improvised tourniquets can also be applied successfully. Tourniquets should not remain in place for more than 2 hours, and ideally less than one hour to minimize risk of peripheral neuropathy.
    d. As noted in TCCC guidelines, appropriate training in tourniquet use on the battlefield is essential to their successful use. Canine handlers and medics should therefore understand the limitations and potential benefit of tourniquet use.

14. **Input and Future Directions**

    a. These guidelines represent an important, but only an initial step, in support of MPCs. Feedback from handlers and first-responders is critical to properly adjust guidelines to current battlefield experiences and evidence-based medicine. USSOCOM veterinary personnel will

be responsible for incorporation of the C-TCCC guidelines into appropriate training and training materials for the command.

b. Other DoD working dogs are ably supported by U.S. Army veterinary personnel, including clinical specialists at the DoD Military Working Dog Veterinary Services, Lackland AFB, TX, the Army Medical Department Center & School, Ft. Sam Houston, TX, U.S. Public Health Command, and the DoD Veterinary Services Activity. Representatives of these organizations serve on the C-TCCC committee to assist in harmonization of medical recommendations for all working dogs supporting U.S. armed forces.
c. This group will also help identify canine medical issues appropriate to military or civilian R&D efforts and resourcing.

15. MPC Resuscitative Care By Non-Veterinary Providers

a. MPC handlers will be trained to provide immediate lifesaving care for their dogs as outlined in the current *Military Working Dog (MWD) Handler's Handbook* as published by the DOD MWD Veterinary Services at Lackland AFB, TX.
b. SOF medics will provide immediate lifesaving care, emergency, and nonemergency care to the MPC within the scope of veterinary practice for which they have been trained.
c. Advanced human healthcare providers (physicians, physician assistants, nurse practitioners, etc.) will only provide initial resuscitation of sick or combat-injured dogs in theater as outlined in the *Clinical Management of Military Working Dogs Clinical Practice Guidelines (CPG)* without veterinary supervision or oversight.
d. Human healthcare providers may provide other emergency and non-emergency care to MPCs only when supervised by, or at the direction of, a veterinarian.
e. Once the sick or injured MPC is stabilized, all efforts will be made to evacuate the MPC to the appropriate level of veterinary care.
f. The *Clinical Management of Military Working Dogs CPG* is available at the U.S. Army Institute of Surgical Research's Joint Trauma System CPG website (http://www.usaisr.amedd.army.mil/cpgs.html).
g. Copies of the *Military Working Dog Handler's Handbook* are available through the DOD MWD Veterinary Services located at Lackland AFB, TX, the local U.S. Army Veterinary Treatment Facility, or the Medical Detachment, Veterinary Services for deployed MPCs.

C-TCCC GUIDELINES

Care Under Fire: Actions taken while still engaged by the enemy.

1. Return fire/take cover.
2. Expect Multi-Purpose Canine (MPC) casualty to remain engaged as a combatant, if appropriate.
3. Move MPC casualty to cover.
4. Muzzle the MPC casualty if airway is not compromised.
5. Try to keep the MPC casualty from sustaining additional wounds.
6. Remove from burning buildings or vehicles to relative safety if it does not endanger the force. Do what is necessary to stop the burning process.
7. Airway management is generally best deferred until the Tactical Field Care phase.
8. Stop *life-threatening* external hemorrhage if tactically feasible, using pressure bandages and hemostatic agents.

Tactical Field Care: Actions taken when no longer engaged by the enemy.

1. If not already done, muzzle the MPC casualty if airway is not compromised.
2. Airway management:
   a. Make sure the neck is reasonably straight; try to bring the head in-line with the neck.
   b. If MPC is unconscious, pull tongue forward to help open airway. If that is unsuccessful, attempt to intubate the MPC before performing a surgical tracheostomy.
   c. If previous measures are unsuccessful, perform surgical tracheostomy. Only perform on an unconscious or sedated dog.
   Respiration:
   a. Consider tension pneumothorax and decompress with needle thoracocentesis, on both sides of chest, if casualty has torso trauma and respiratory distress.
   b. Sucking chest wounds should be treated by applying a chest seal during expiration and monitoring for development of a tension pneumothorax.
3. Circulation:
   Assess for unrecognized hemorrhage and control all sources of bleeding using pressure bandages or hemostatic agents if available.
4. Peripheral intravenous (IV) access:
   a. Start an 18-gauge IV or saline lock, if indicated, or if evacuation times are extended.
   b. If resuscitation is required and IV access is not obtainable, use the intraosseous (IO) route.
5. Fluid resuscitation:
   a. If not in shock: no IV fluids necessary.
   b. If in shock: crytalloids 10-20 ml/kg IV, may repeat up to 2 times OR colloids 500 ml IV bolus over 20-30 minutes, once.
   c. Continued efforts to resuscitate must be weighed against logistical and tactical considerations and the risk of incurring further casualties.
   d. Reassess for fluid resuscitation for extended CASEVAC times.
6. Prevention of hypothermia:
   a. Minimize casualty's exposure to the elements.
   b. Dry patient if necessary.
   c. Apply/wrap in a rescue or heat blanket, as needed.
   d. Other options include: dry blankets, poncho liners, sleeping bags, body bags, or anything that will retain heat and keep the casualty dry.
7. Monitoring:
   a. Pulse oximetry should be available as an adjunct to clinical monitoring.
   b. Place on tongue, ear, flank, or other nonpigmented, highly vascular (hairless) area.
   c. Readings may be misleading in the settings of shock or marked hypothermias
   d. If dog is intubated, use a handheld capnography device to monitor end tidal CO_2 and respirationss
8. Inspect and dress known wounds.
9. Check for additional wounds.
10. Analgesia, sedation & patient control as necessary:
    a. Morphine sulfate, 10-30 mg IM, (primary analgesia), monitor for respiratory depression; **CAUTION:** Morphine can cause vomiting. Be prepared to remove muzzle.

b. Dilaudid
c. Fentanyl

11. Splint fractures and recheck pulse of the affected limb.
12. Antibiotics: recommended for all open combat wounds
    a. If able to take PO: moxifloxacin (400mg orally qd)
    b. If unable to take PO (shock, unconsciousness): Cefotetan, 1g IV (slow push over 3-5 minutes) or IM every 8 hours, OR Ertapenam, 0.5g IV or IM every 12 hours (Do not exceed 1g in a 24 hour period).
13. Cardiopulmonary resuscitation should not be attempted, unless in a safe area and all human casualties are stable, as it is rarely effective due to:
    a. Massive noncompressible thoracic hemorrhage.
    b. Massive noncompressible abdominal hemorrhage.
    c. Severe head injury leading to respiratory and cardiac arrest.
    d. Massive pulmonary contusions leading to respiratory and cardiac arrest.
    e. Tension pneumothorax, which should be treated by needle decompression.
14. Document clinical assessments, treatments rendered, and changes in casualty's status. Forward this information with the MPC casualty to the next level of care

Tactical Evacuation (TACEVAC) Care: Actions taken when the injured patient is being evacuated from the point of injury.

1. Airway management:
   a. Make sure the neck is reasonably straight; try to bring the head in-line with the neck. If the MPC is unconscious, pull tongue forward to help open airway. If that is unsuccessful, attempt to intubate the MPC before performing a surgical tracheostomy.
   b. If previous measures are unsuccessful, perform surgical tracheostomy. Only perform on an unconscious or sedated dog.
2. Respiration:
   a. Consider tension pneumothorax and decompress with needle thoracocentesis, on both sides of chest, if casualty has torso trauma and respiratory distress.
   b. Most MPC casualties do not require oxygen, but administration of oxygen may be of benefit.
   C. Open or sucking chest wounds require a chest seal applied during expiration and monitoring for development of a tension pneumothorax.
3. Circulation:
   a. Assess for unrecognized hemorrhage and control all sources of bleeding using pressure bandages or hemostatic agents as needed.
4. Peripheral IV access:
   a. Reassess need for peripheral IV access—if indicated, start an 18-gauge IV or saline lock; if resuscitation is required and IV access is not obtainable, use IO route.
5. Fluid resuscitation:
   a. Reassess for hemorrhagic shock; altered mental status (in the absence of brain injury), and change in pulse character.
   b. If not in shock: no IV fluids necessary.
   c. If in shock: crytalloids 10-20 ml/kg IV, may repeat up to 2 times OR colloids 500 ml IV bolus over 20-30 minutes, once.
6. Prevention of hypothermia:
   a. Minimize casualty's exposure to the elements.
   b. Dry patient if necessary.
   c. Continue heat or rescue blanket(s), but limit warming of TBI casualties.
   d. Utilize portable fluid warmers on all IV sites if possible.
   e. Protect the casualty from wind if doors must be kept open.
7. Monitoring:
   Institute electronic monitoring of pulse oximetry and vital signs if indicated.
8. Inspect and dress known wounds if not already done.
9. Check for additional wounds.
10. Analgesia, sedation & patient control as necessary
    a. Morphine sulfate, 10-30mg IM, (primary analgesia) monitor for respiratory depression
    CAUTION: Morphine can cause vomiting. Be prepared to remove muzzle.
    b. Dilaudid
    c. Fentanyl

11. Reassess fractures and recheck pulses of the affected limb(s).
12. Antibiotics: recommended for all open combat wounds
    a. If able to take PO: moxifloxacin (400mg orally qd)
    b. If unable to take PO (shock, unconsciousness): Cefotetan, 1g IV (slow push over 3-5 minutes) or IM q 8 hours, OR ertapenem, 0.5g IV or IM q 12 hours (Do not exceed 1 g in a 24 hour period).
13. Document clinical assessments, treatments rendered, and changes in casualty's status. Forward this information with the MPC casualty to the next level of care.

2017 USSOCOM CANINE TACTICAL COMBAT CASUALTY CARE (C-TCCC) Guidelines

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Burn Quick Reference Guide

Type of Injury

1. First Degree: superficial, involving only epidermal damage
   a. erythematous and painful due to intact nerve endings
   b. heal in 5 to 10 days; pain resolves within 3 days
   c. no residual scarring
2. Second Degree: partial thickness, involving the epidermis and dermis
   a. more superficial burns are moist and blister; deeper burns are white and dry, blanch with pressure, and have reduced pain
   b. heal in 10 to 14 days
   c. can develop into third degree burns with infection, edema, inflammation and ischemia
   d. treatment varies with degree of involvement - grafting is indicated for deep burns
3. Third Degree: full-thickness, most severe of burns
   a. results in necrosis and avascular areas
   b. tough, waxy, brownish leathery surface with eschar, numb to touch
   c. grafting required
   d. usually have permanent impairment
4. Fourth Degree: full-thickness as well as adjacent structures such as fat, fascia, muscle or bone
   a. reconstructive surgery is indicated
   b. severe disfigurement is common

Body Surface Area (BSA)

1. Adult
   a. "rule of nines": each arm is 9% of BSA, leg is 18%, anterior trunk is 18%, posterior trunk is 18%, head is 9%, and perineum is 1% (see chart)
2. Children
   a. BSA varies with age (children have a larger percentage of body surface area which exaggerates fluid losses)
   b. children under 10 years old should be evaluated by the Lund-Browder burn chart (see chart)
   c. quick method: the patient's palm is 1 of the total body surface area

Severity

1. Minor:
   a. partial thickness: < 15% BSA in adults, < 10% BSA in children
   b. full thickness: < 2% BSA
2. Moderate:
   a. partial thickness: 15%-25% BSA in adults, 10%-20% BSA in children
   b. full thickness : 2%-10% BSA
3. Major:
   a. partial thickness: > 25% BSA in adults, > 20% BSA in children
   b. full thickness: > 10% BSA
   c. burns of hands, face, eyes, ears, feet or perineum
   d. associated injuries, such as inhalation injury, fractures, other trauma
   e. poor risk patients with underlying disease or suspicion of child abuse

(http://www.peds.umn.edu/divisions/pccm/teaching/acp/burns.html)

Modified Brooke formula for adults: 2mL/kg/%TBSA. Plan to give ½ of the estimated fluid in the first 8hrs.

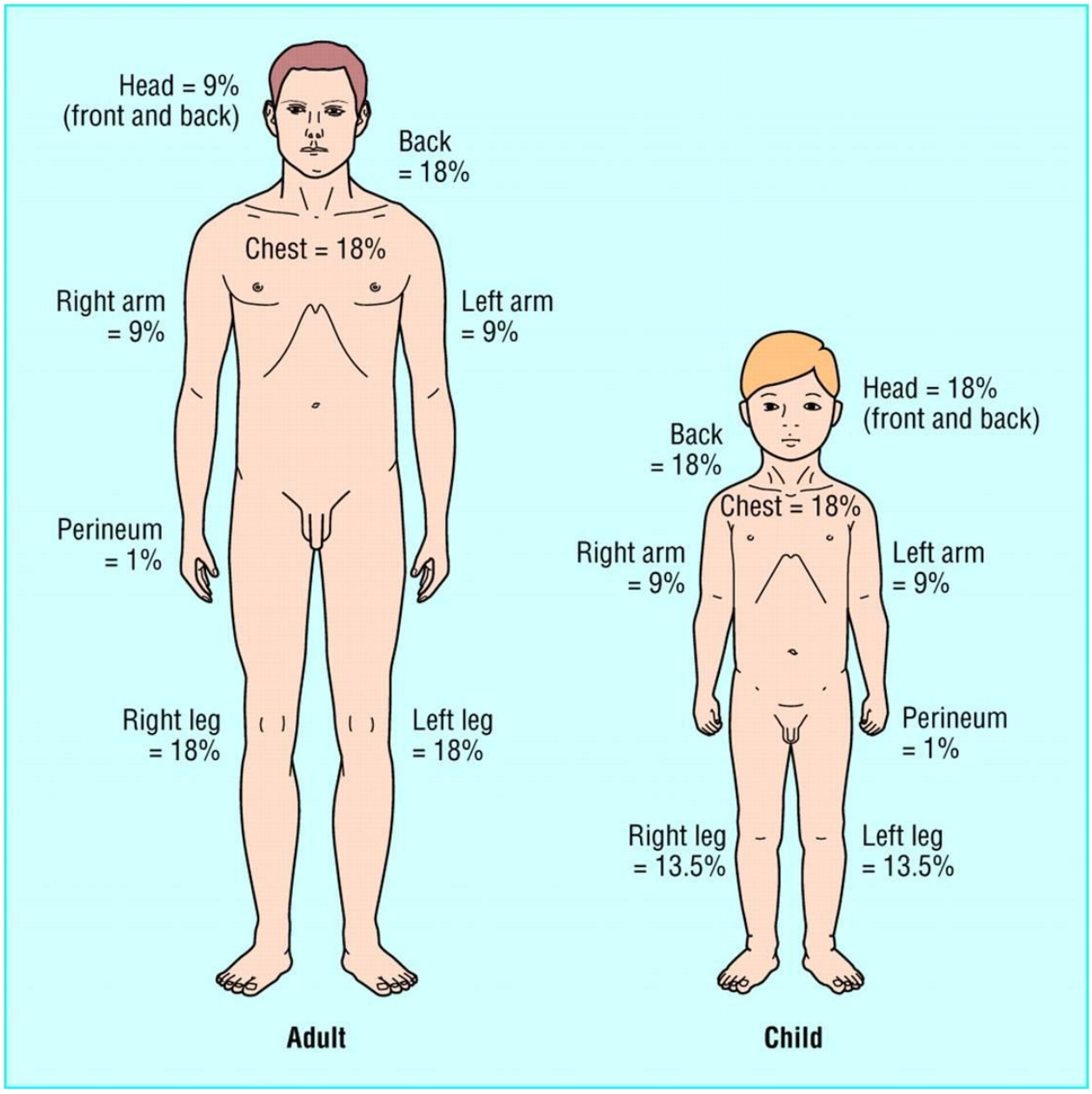
In children weighing less than 30kg the infusion rate is estimated at 3mL/kg/≥%TBSA. Plan to give ½ of the estimated fluid over the first 8hr. Children will also need maintenance fluids of 5% dextrose in ½ normal saline. This should be given using a rule such as the 4-2-1 rule: 4mL/kg/hr for the first 10 kg, 2mL/kg/h for the next 10 kg, and 1mL/kg/h for the next 10 kg. If a patient's resuscitation has been delayed by a few hours, then give fluid more rapidly.

Adjust the initial fluid infusion rate to the urine output. Failure to monitor and record the urine output (catheter or bedpan) and adjust the fluid rate hourly may result in death or severe complications. Adequate urine output is 30-50mL/hr in an adult and 1mL/kg/hr in a child who weighs less than 30kg. If the output is greater, or less than, the target for 2 consecutive hours, decrease, or increase, the IV rate by 20% respectively until the rate is satisfactory.

(*Special Operations Forces Medical Handbook, 2nd Edition*)

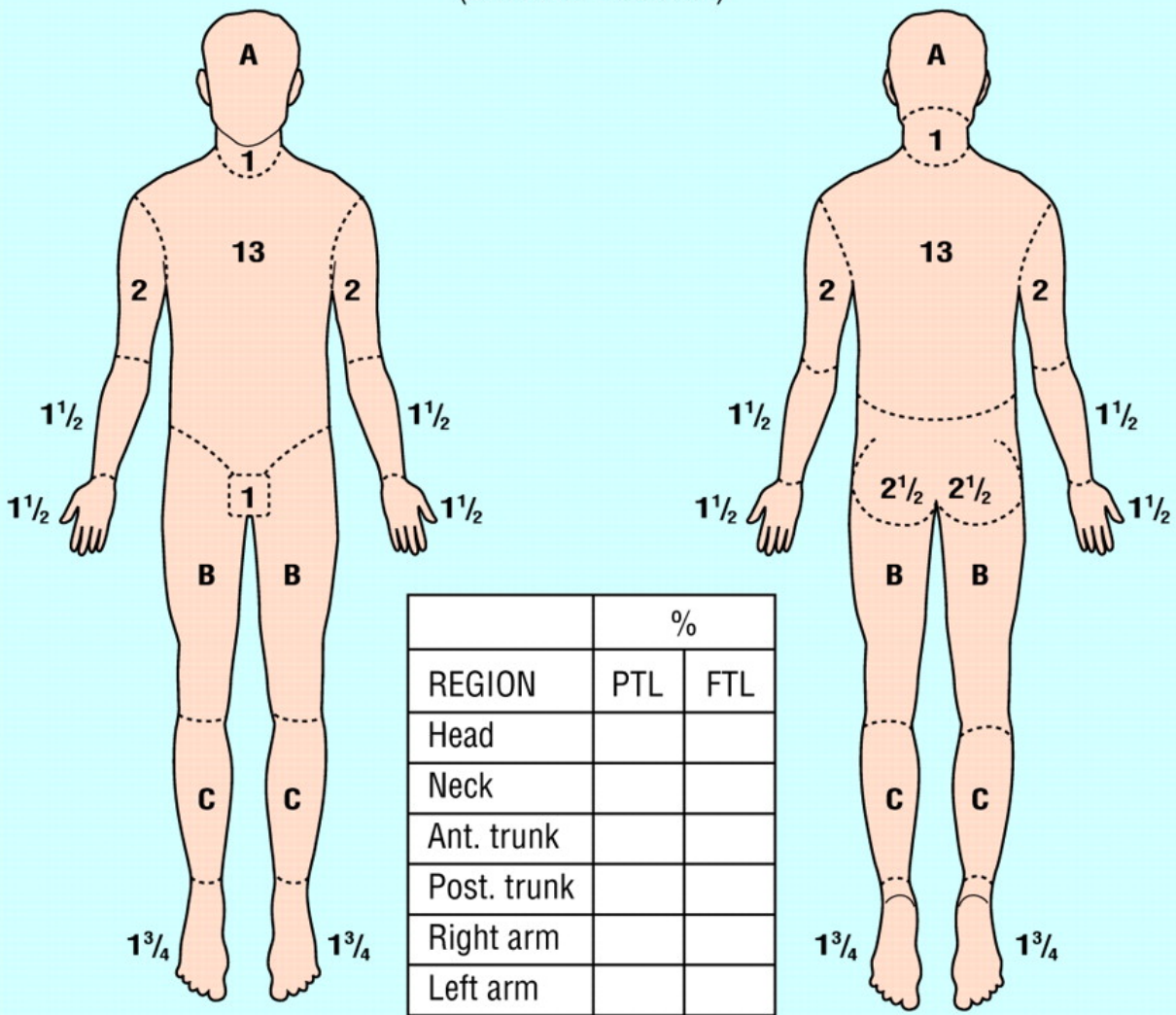
Rule of 10 for Fluid Resuscitation of Burn Victims

1. Initial rate is 10mL per %TBSA per hour for a maximum casualty weight of 80kg.
2. Add 100mL/hr to the rate for each 10kg above 80kg.
3. Example: A 90kg casualty with 50% TBSA bum would receive an initial rate of (10mL x 50)/hr + 100mL/hr or 600mL/hr.


Head = 9%
(front and back)
Back
= 18%
Chest = 18%
Right arm
= 9%
Left arm
= 9%
Perineum
= 1%
Right leg
= 18%
Left leg
= 18%
Adult
Head = 18%
(front and back)
Back
= 18%
Chest = 18%
Right arm
= 9%
Left arm
= 9%
Perineum
= 1%
Right leg
= 13.5%
Left leg
= 13.5%
Child

% Total Body Surface Area Burn

Be clear and accurate, and do not include erythema
(Lund and Browder)



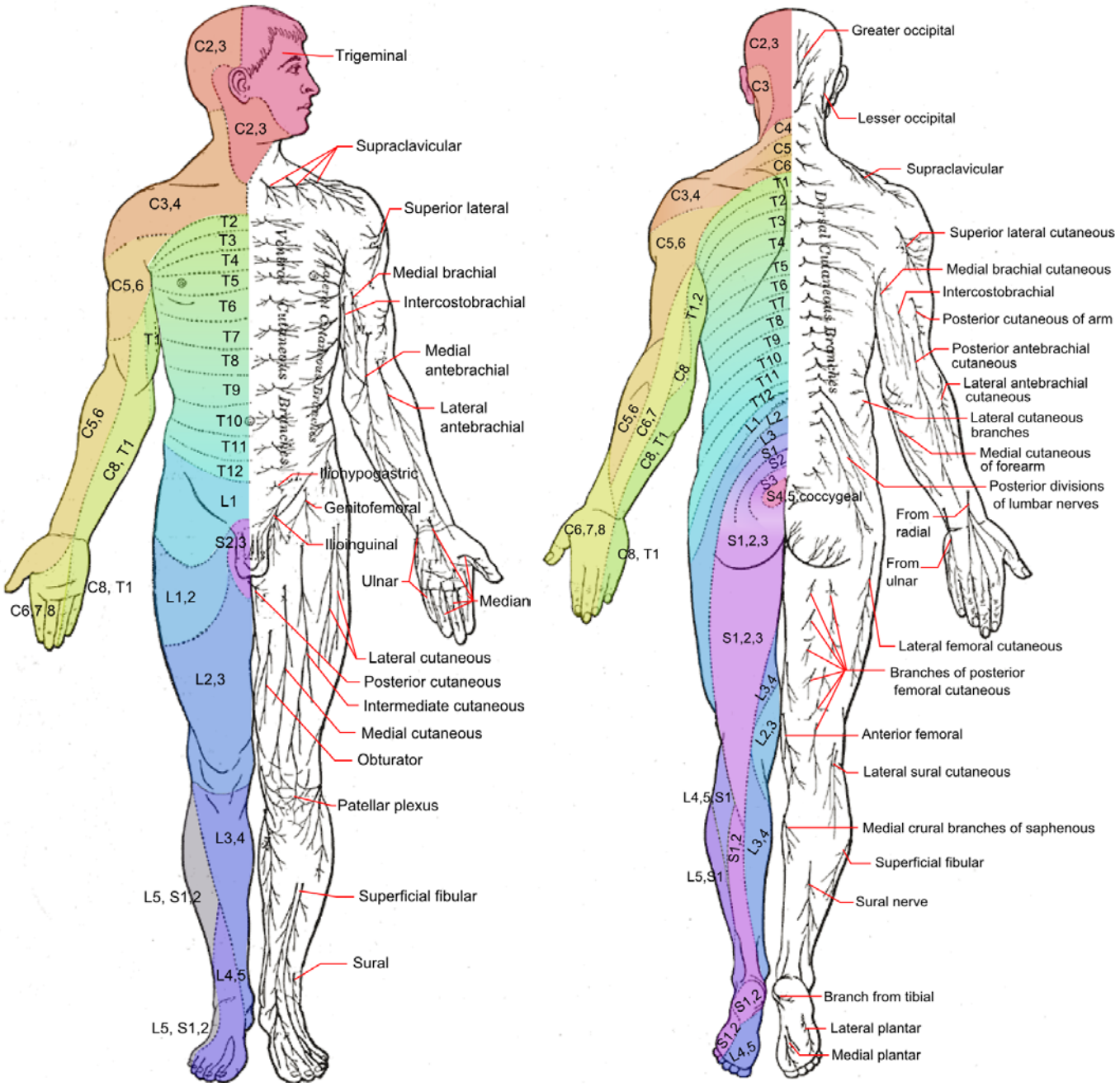
	%	
REGION	PTL	FTL
Head		
Neck		
Ant. trunk		
Post. trunk		
Right arm		
Left arm		
Buttocks		
Genitalia		
Right leg		
Left leg		
Total burn		

AREA	Age 0	1	5	10	15	Adult
A = ½ OF HEAD	9½	8½	6½	5½	4½	3½
B = ½ OF ONE THIGH	2¾	3¼	4	4½	4½	4¾
C = ½ OF ONE LOWER LEG	2½	2½	2¾	3	3¼	3½

NERVE CHART

Dermatomes and Cutaneous Nerves

Schematic demarcation of dermatomes
There is considerable overlap between any two adjacent dermatomes



Häggström, Mikael. "Medical gallery of Mikael Häggström 2014". Wikiversity Journal of Medicine 1 (2). DOI:10.15347/wjm/2014.008. ISSN 20018762.

Levels of Principal Dermatomes

- C5-clavicles
- C5, C6, C7 - lateral parts of the upper limb
- C8, T1 - medial sides of the upper limb
- C6 - thumb
- C6, C7, C8 - hand
- C8 - ring and little fingers
- T4 - level of nipples
- T10 - level of umbilicus
- T12 - inguinal or groin regions
- L1, L2, L3, L4 - anterior and inner services of lower limb
- L4, L5, S1 - foot
- L4 - medial side of big toe
- S1, S2, L5 - posterior and outer surfaces of lower limbs
- S1 - lateral margin of foot and little toe
- S2, S3, S4 - perineum

NERVE TABLE

Sensory/Motor Impairments Related to Level Spinal Injury

Disc	Root	Reflex	Muscles	Sensation
C4-C5	C5	Biceps	Deltoid Biceps	Lateral arm Axillary nerve
C5-C6	C6	Brachioradialis Biceps	Wrist extension Biceps	Lateral forearm Musculocutaneous nerve
C6-C7	C7	Triceps	Wrist flexors Finger extension Triceps	Middle finger
C7-T1	C8		Finger extension Hand intrinsics	Medial forearm Medial antebrachial cutaneous nerve
T1-T2	T1		Hand intrinsics	Medial arm Medial antebrachial cutaneous nerve
L3-L4	L4	Patellar	Anterior tibialis	Medial leg Medial foot
L4-L5	L5	Internal hamstring (difficult to elicit)	Extensor hallicus longus Peroneus longus	Lateral leg Dorsum of foot
L5-S1	S1	Achilles Internal hamstring External hamstring	Gastrocnemius	Sole of foot Lateral foot